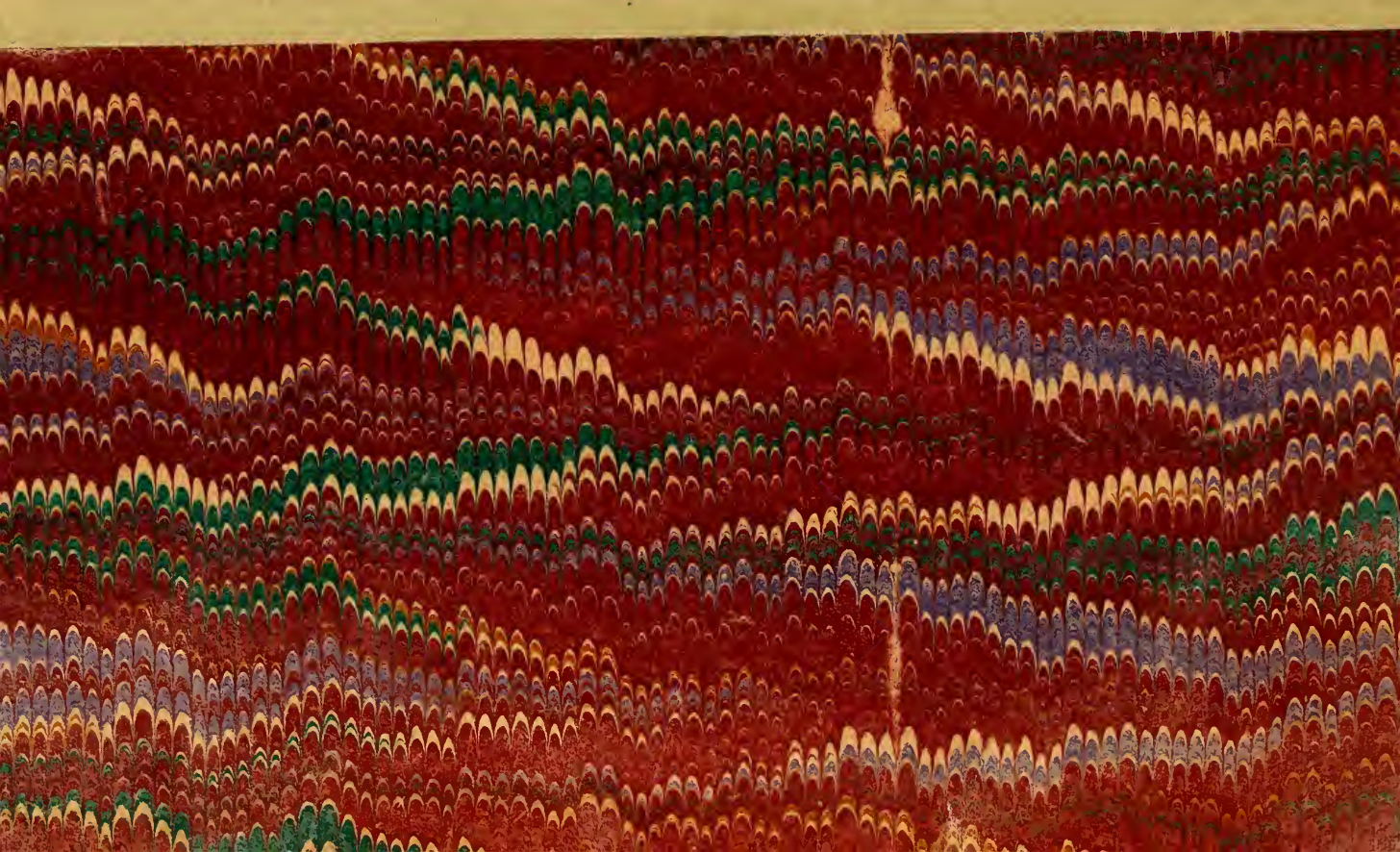

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AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

January 4th, 1905.—The meeting was called to order at 8.40 P. M., G. W. Tillson, M. Am. Soc. C. E., in the chair; Chas. Warren Hunt, Secretary; and present, also, 88 members and 12 guests.

The minutes of the meetings of December 7th and 21st, 1904, were approved as printed in the *Proceedings* for December, 1904.

A paper entitled "Methods of Location on the Choctaw, Oklahoma and Gulf Railroad," by F. Lavis, Assoc. M. Am. Soc. C. E., was presented by the author. The paper was discussed by Messrs. E. Sherman Gould, G. H. Thomson, and the author.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

John William Barnett, Athens, Ga.
Ernest Wilder Clarke, Cristobal, Canal Zone, Panama.
Cloud Clifford Conkling, Buffalo, N. Y.
William Easby, Jr., Philadelphia, Pa.
Jacob Martin Floesch, Rochester, N. Y.
Porter Dwight Ford, Richmond Hill, N. Y.
James Cottle Hallsted, New York City.
John Albert Knighton, New York City.
Jacob Stinman Langthorn, New York City.
David Spencer Merritt, Tarrytown, N. Y.
Emil Newman, Los Angeles, Cal.
Franklin Augustus Snow, Boston, Mass.

As Associate Members.

Howard Edward Boardman, New York City.
Frank Harvie Carter, Waterville, Me.
Harry Outen Cole, New York City.
Herman Conrow, New York City.
James Haven Crosett, San Francisco, Cal.
John Williams Doty, New York City.
Willard Franklin Graves, Chicago, Ill.
Granbery Jackson, Nashville, Tenn.
Warren Byron Keim, Harrisburg, Pa.
James Leonard Lytel, Montrose, Colo.
Robert Henry McPherson, New York City.
Chester John Myers, Atlantic City, N. J.
Luther Stevens Oakes, Seattle, Wash.
Moses Edmund Shire, Chicago, Ill.
John Jervis Vail, Rahway, N. J.

The Secretary announced:

The transfer of the following candidates, by the Board of Direction, on January 3d, 1905:

From Associate Member to Member.

Henry Clayton Allen, Albany, N. Y.
Clinton Sumner Burns, Kansas City, Mo.
William Conquest Tucker, New York City.
Daniel Lawrence Turner, New York City.
Wilbur Jay Watson, Cleveland, Ohio.

The election of the following candidates, by the Board of Direction, on January 3d, 1905:

As Juniors.

Roger Derby Black, Fort Leavenworth, Kans.
Herbert Willard Goddard, New York City.
Paul Hansen, Columbus, Ohio.
Thayer Lindsley, New York City.
Curlys Lyon Slocum, New Haven, Conn.
Achille Octave Van Suetendael, Yonkers, N. Y.
Donald Cramer Waite, Yonkers, N. Y.

The Secretary announced the death of John Miller Cunningham, elected Associate Member October 7th, 1903; died August 8th, 1904.

Adjourned.

January 18th, 1905.—The minutes of this, the Annual Meeting, will be printed in the *Proceedings* for February, 1905.

OF THE BOARD OF DIRECTION.

(Abstract.)

January 3d, 1905.—Vice-President Deyo in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Buck, Craven, Croes, Ellis, Gowen, N. P. Lewis, Pegram, Osgood and Webster.

Action was taken in regard to members in arrears for dues.

The Annual Report of the Board was adopted for presentation to the Annual Meeting.

The following report was received from the Committee on Award of Prizes:

"Nov. 30, 1904.

"Mr. Chas. Warren Hunt,
"*Secretary,* Am. Soc. C. E.,
"220 W. 57th St., New York.

"Dear Sir:

"The undersigned Committee, appointed for this purpose, have the honor to recommend the award of prizes for the year ending with the *Transactions* for the month of July, 1904, as follows:

"The Norman Medal to Mr. Emile Low for his paper No. 971, on The Breakwater at Buffalo, N. Y.

"The Thomas Fitch Rowland Prize to Mr. George Cecil Kenyon for his paper No. 970, on Dock Improvements at Liverpool.

"The Collingwood Prize for Juniors to Mr. Herbert J. Wild for his paper No. 976, on The Substructure of Marsh River Bridge.

"Respectfully submitted,
"Charles L. Strobel,
"Samuel Tobias Wagner,
"J. L. Ludlow,
"*Members Committee.*"

The Norman Medal, The Thomas Fitch Rowland Prize, and the Collingwood Prize for Juniors were awarded in accordance with the recommendation of the above report.

Announcement was made of the election, on December 16th, 1904, of Sir William Henry White, as Honorary Member of the Society.

A Local Committee of Arrangements for the next Annual Convention was appointed.

Correspondence between Sir William H. White, President, Inst. C. E., and Charles Hermany, President, Am. Soc. C. E., was presented and ordered printed in *Proceedings* for the information of members.

The following resignations were accepted as taking effect December 31st, 1904:

MEMBERS:

LATHAM ANDERSON,
NORTON L. TAYLOR.

ASSOCIATE MEMBER:

HARRY LINCOLN NOYES.

JUNIORS:

FREDERICK F. HALL,
GEORGE C. HOPKINS, JR.

Applications were considered and other routine business transacted.

Five Associate Members were transferred to the grade of Member, and seven candidates for Junior were elected.

Adjourned.

VISIT OF MEMBERS OF THE INSTITUTION OF CIVIL ENGINEERS.

The following letters are printed for the information of the membership:

"The Institution of Civil Engineers,
"Great George Street, Westminster, S. W.
"8 November, 1904.

"Charles Hermany, Esq.,
"*President of the*
"*American Society of Civil Engineers.*

"My Dear Sir: The Council of the Institution of Civil Engineers desire me to express to you, as President of the American Society of Civil Engineers, their high appreciation of the courtesy and kindness shown by your Society to members of the Institution during the recent visit to the United States.

"Their special thanks are due to the Reception Committee and to the Secretary of your Society for the admirable arrangements made throughout their visit, by which opportunities were provided for visiting many of the most recent and important Engineering works, while their comfort in travelling was secured. The Council will be grateful if you will convey to the various authorities the sincerest thanks of those members who formed the party, and of the Institution as a whole, for the facilities so generously afforded.

"The ladies of our party desire to acknowledge their indebtedness to the American ladies for the unfailing kindness and consideration shown to them, and for the many pleasant excursions arranged in New York and Chicago.

"Your splendid hospitality well maintained the national repute, and will not be forgotten.

"The Council learn with satisfaction that the International Engineering Congress at St. Louis, organized by your Society, was a complete success, and trust that this result was due, in some degree, to the large representation of the Institution by members attending not merely from the mother country but from all parts of the British Empire.

"The acceptance of the cordial invitation of the American Society of Civil Engineers was intended by the Council to mark their high esteem of their professional brethren upon whom rests the responsibility for the great Engineering works of the United States. This action was unprecedented in the history of the Institution, and its happy results are welcomed by the Council, who feel confident that the visit will tend to draw closer the connection between Ameri-

can and British Civil Engineers, and to strengthen the friendship and cordial relations of the two countries.

"I am,
"My dear Sir,
"Yours faithfully,
"W. H. WHITE."

"LOUISVILLE, Ky., No. 549 Third St.,
"DEC. 31, 1904.

"SIR WILLIAM H. WHITE,
"President, Institution of Civil Engineers,
"LONDON, ENGLAND.

"DEAR SIR: Your courteous and friendly letter of the 8th ult., to the American Society of Civil Engineers, was duly received, and for the graceful compliments and friendly sentiments therein expressed, the American Society makes respectful acknowledgment and will take pleasure in making known to its Members this formal announcement by the Institution of Civil Engineers of the high esteem and appreciation with which it regards our endeavors to honor and serve them, our recent distinguished guests.

"The remembrance of the series of pleasant events, with the numerous surprising and charming proofs of race affinities and high professional and national esteem, will be cherished memories by those who participated in professional and social functions, and the report thereof read by all the Members with pride and joy. It gives us pleasure to convey to your Council the fact that in this sentiment the American ladies join us, and to add that it reflects a universal sentiment among us.

"An account of your visit (though brief) and those of the English ladies who accompanied you, with the friendly intercourse resulting therefrom, will go on record as an epoch in our Society's history.

"Very Respectfully and Cordially yours,
"CHAS. HERMANY,
"President."

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, February 1st, 1905.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper entitled "Maximum Rates of Rainfall at Boston," by Charles W. Sherman, M. Am. Soc. C. E., will be presented for discussion.

This paper was printed in *Proceedings* for December, 1904.

Wednesday, February 15th, 1905.—8.30 P. M.—At this meeting a paper entitled "The Water-Works of Porterville, California," by Philip E. Harroun, M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings.*

Wednesday, March 1st, 1905.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper entitled "Technical Methods of River Improvement, as Developed on the Missouri River, by the General Government, from 1876 to 1903," by S. Waters Fox, M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings.*

ANNUAL CONVENTION.

The Thirty-Seventh Annual Convention will be held in Cleveland, Ohio, June 20th-23d, 1905. The following Committees have been appointed to take charge of the arrangements.

COMMITTEE OF THE BOARD OF DIRECTION:

ALFRED CRAVEN, *Chairman;*
N. P. LEWIS,
W. J. WILGUS,
CHARLES S. GOWEN,
CHAS. WARREN HUNT.

LOCAL COMMITTEE:

A. MORDECAI, *Chairman;*
W. P. BROWN,
WM. J. CARTER,
E. A. HANDY,
A. M. JOHNSTON,
M. W. KINGSLEY,
J. FRANCIS LE BARON,
F. C. OSBORN,
W. P. RICE,
J. RITCHIE,
S. T. WELLMAN,
C. H. WRIGHT.

PRIVILEGES OF LOCAL SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

The Boston Society of Civil Engineers will welcome any member of the American Society of Civil Engineers at its library and reading room, 517 Tremont Temple, Boston, which is open on weeks days from 9 A. M. to 5 P. M. Members will also be welcome at the meetings, which are held in the same building, on the evenings of the fourth Wednesday in January, and the third Wednesdays of other months, except July and August.

The rooms of **The St. Louis Engineers' Club** are in the business center of St. Louis, and visiting engineers are cordially invited to use them for mail, telephone service, information, etc.

The courtesies of **The Engineers' Society of Western Pennsylvania** have been extended to members of the American Society of Civil Engineers. The rooms of the Society, 410 Penn Ave., Pittsburg, Pa., are open at all times, and meetings are held as follows, except during July and August. REGULAR SECTION, Third Tuesdays; CHEMICAL SECTION, Thursdays following third Tuesdays; MECHANICAL SECTION, First Tuesdays; STRUCTURAL SECTION, Fourth Tuesdays.

The Western Society of Engineers, Monadnock Block, Chicago, Ill., tenders to members of this Society the use of its rooms and facilities, together with the good offices of its Secretary and of a special committee appointed for that purpose.

The Civil Engineers' Club of Cleveland, Ohio, invites members of this Society to make use of the Club rooms, at any time when in Cleveland. Cards will be furnished on application to the Secretary, Mr. J. C. Beardsley.

The Engineers' Club of Central Pennsylvania has established new quarters at the corner of Second and Walnut Streets, Harrisburg, Pa., and desires to extend the courtesies of the Club to visiting members of the American Society of Civil Engineers.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be

performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

ANNUAL REPORT OF THE BOARD OF DIRECTION FOR THE YEAR ENDING DECEMBER 31st, 1904.

Presented at the Annual Meeting, January 18th, 1905.

The Board of Direction, in compliance with the Constitution of the Society, presents its report for the year ending December 31st, 1904.

MEMBERSHIP.

The changes in membership are shown in the following table:

Grade.	Jan. 1st, 1904.			Jan. 1st, 1905.			Losses.				Additions.		Totals.	
	Resident.	Non-Resident.	Total.	Resident.	Non-Resident.	Total.	Transfer.	Resignation.	Dropped.	Death.	Transfer.	Election.	Loss.	Gain.
Honorary Members	1	8	9	1	8	9	..	..	..	1	....	1	1	1
Corresponding Members	....	2	2	....	2	2	..	..	..	..	....	....	....	....
Members	335	1 322	1 657	376	1 419	1 795	..	3	4	25	*61	‡109	32	170
Associate Members	209	600	809	240	663	903	60	2	7	4	†27	140	73	167
Associates	48	77	125	51	76	127	3	1	1	..	....	7	5	7
Juniors	117	176	293	116	224	340	25	5	1	..	....	§78	31	78
Fellows	8	21	29	9	18	27	..	..	..	2	....	....	2	....
Totals	718	2 206	2 924	793	2 410	3 203	88	11	13	32	88	335	144	423

* 60 Associate Members and 1 Junior.
† 3 Associates and 24 Juniors.
‡ 2 Reinstatements.
§ 1 Reinstatement.

From the above table it will be seen that the net increase in membership during the year was 279, the largest yearly increase on record.

As stated in the report of the Board for 1903, the yearly net increase, previous to 1899, reached 100 only in four separate years, no two of which were consecutive. The net increase for each year beginning with 1899 follows:

1899	103
1900	138
1901	190
1902	185
1903	212
1904	279
Total net increase for past six years	1 107
Average net yearly increase for the past six years	184½

For comparison, it may be stated that the average net increase previous to 1899 was as follows:

The average net yearly increase 1870-78 was 48.1
" " " " " 1879-88 " 61.1
" " " " " 1889-98 " 89.3

It is also interesting to note the total number of applications received during the six-year period above referred to.

Total number of applications received during 1899.....259
" " " " " " 1900.....308
" " " " " " 1901.....375
" " " " " " 1902.....362
" " " " " " 1903.....432
" " " " " " 1904.....503

The losses by death reported during the year number 32. They are as follows:

Honorary Member: Charles Storer Storrow.

Members: Danforth Hurlbut Ainsworth, Jacob Neff Barr, Louis Frederic Gustav Bouscaren, James Peter Bogart, Standish Barry Burton, Wilson Crosby, Clark Fisher, Frederick Reginald French, George Clinton Gardner, Joseph Norton Greene, Lorenzo Medici Johnson, Jacob Albert Latcha, Richard Calvin McCalla, Thomas McKeown, Henry Louis Marindin, Alexander Macomb Miller, William Arthur Pratt, B. Frank Richardson, Alfred Rosenzweig, Thomas Pearman Shanks, Reuben Shirreffs, Benjamin Burgh Smith, Selwyn Mellon Taylor, George Curtis Tingley, Alonzo J. Tullock.

Associate Members: Fritz Carl Anders Georg Bergengren, John Miller Cunningham, George Thompson DeForest, Van Norman McGee.

Fellows: James W. Ainslie, William Ward Reed.

LIBRARY.

The accessions to the Library during the year are shown in the following table:

ACCESSIONS DURING THE YEAR 1904.

	Bound Volumes.	Unbound Volumes.	Specifications.	Maps, Photographs and Drawings.	Total.
Donations—					
In answer to special requests	162	604	2	4	772
From publishers	48	4	...	...	52
In regular course....	564	955	137	151	1 807
By purchase	106	39	...	...	145
Totals	880	1 602	139	155	2 776

In addition to the above, there have been received 185 duplicates, and 78 separate numbers to complete files of periodicals, neither of which can appear as accessions. A large number of donations have also been received, which, owing to pressure of other work, have not been catalogued and do not appear in the above figures.

The Library now contains:

Bound volumes	13 462
Unbound volumes	27 353
Specifications	6 002
Maps, photographs and drawings	3 467
Total	50 284

The total number of titles in the Library is 20 310.

During the year, 288 volumes have been bound, and 28 bound volumes which are duplicates were received and have replaced previously unbound volumes.

The following amounts have been expended upon the Library during the year:

Purchase of books, 145 volumes	$490.45
Express charges, etc	46.38
Binding 288 volumes	321.65
Fixtures, supplies and sundries	67.83
Total	$926.31

The value of the accessions to the Library during the year is as follows, each accession having been valued separately, as received:

2 631 Donations and exchanges (estimated value)	$2 038.22
145 Volumes purchased (cost)	490.45
Binding 288 volumes	321.65
Total	$2 850.32

The Board wishes to point out the effect of the policy adopted in 1897, and continued since that time, of thoroughly cataloguing and indexing the Library, and of the purchase of all new engineering books which cannot be secured by donation. While the first cost and expense of maintenance, of the thoroughly classified index (two volumes of which have already been printed and issued to members), has been large, it seems to have been fully justified. As the aim of the Society to furnish every facility for study and research becomes known to our members and to the public, the Reading Room attendance increases. It should be borne in mind that this attendance is not like that of a club, but that each person recorded in the figures given, visits the Library for study, or to look over Current Technical Literature.*

*It may be of interest to state that 224 Engineering Periodicals are regularly received and kept on file in the Reading Room.

During the first five years of occupancy of the present house the average yearly Reading Room attendance was 1 712, the largest number of visitors in any one year being 1 794. During 1903 this attendance was 2 075, and in 1904 increased to 3 475.

In addition to this, members frequently take advantage of the opportunity given to have searches made, and this work now takes a large part of the time of one of the Assistant Librarians, having increased more than 50% during the past year. Type-written bibliographies of 47 subjects, covering more than 1 000 separate references, have been furnished to members during the past year, and many expressions of gratification as to the character of the work done and the great convenience it is to busy engineers, have been received. The actual cost to the Society is charged for this work, and it may be of interest to state that the average time consumed in finding and type-writing each item is 20 minutes, and the average cost 13 cents.

PUBLICATIONS.

During the year the usual ten numbers of *Proceedings* and two volumes of *Transactions* have appeared.

In the *Proceedings,* the list of references to current engineering literature has covered 102 pages, containing 4 968 classified references to 71 periodicals.

The stock of the various publications of the Society, kept on hand for the convenience of members and others, now amounts to 123 711 copies, the cost of which to the Society, for paper and press-work only, has been $15 391.11.

During the year, 3 083 volumes of the Society publications have been bound, for members and others, in the standard half-morocco or cloth bindings.

The extra publications during the year have been the Advance Copies of the Papers of the International Engineering Congress, referred to in this Report under another head.

Summary of Regular Publications for 1904.

	Issued.	Edition.	Total Pages.	Plates.	Cuts.
Transactions (Volumes)*.....	2	3 425	1 098	58	285
Proceedings (Monthly Numbers)*	10	3 535	1 492	55	227
Constitution and List of Members	1	3 900	230	...	1
Total	13	....	2 820	113	513

* Includes Indexes and Tables of Contents.

The cost of regular publications has been:		
For Paper, Printing, Binding, etc., *Transactions* and *Proceedings*		$9 535.92
For Plates and Cuts		1 308.70
For Boxes, Mailing Lists, Copyright and Sundry Expenses		236.95
For Commission on Advertisements		18.52
For 7 450 copies of Memoirs and Papers		574.65
For List of Members		1 029.02
Total		$12 703.76
Deduct amount received from sale of publications	$2 660.97	
Deduct amount received for advertisements	30.00	
		2 690.97
Net cost of Regular Publications for 1904		$10 012.79

MEETINGS.

During the year, 20 meetings have been held, as follows: Annual Meeting, 1; at the Annual Convention, 2; regular semi-monthly meetings, 17.

At these meetings, there were presented 19 formal papers, 4 of which were illustrated with lantern slides, and 3 illustrated lectures.

The Thirty-sixth Annual Convention was held in St. Louis, Mo., in connection with the International Engineering Congress, and the registered attendance numbered 391 members and 485 guests.

MEDALS AND PRIZES.

For the year ending with the month of July, 1903, Prizes were awarded as follows:

The Thomas Fitch Rowland Prize to George W. Fuller, Assoc. M. Am. Soc. C. E., for his paper entitled "The Filtration Works of the East Jersey Water Company, at Little Falls, New Jersey."

The Collingwood Prize for Juniors to Isaac Harby, Jun. Am. Soc. C. E., for his paper entitled "The Footbridge for Building the Cables of the New East River Bridge."

No award of the Normal Medal was made.

SOCIETY HOUSE.

After careful consideration, the Board decided early in the year to acquire, if possible, additional land for the enlargement of the present House, and at its May meeting, at which twenty members of the Board were present, unanimously authorized the purchase of

the lot, 25 ft. front, with an average depth of 116 ft., immediately adjoining the present property on the west, and on June 6th, 1904, the title to this property passed to the Society.

The price of this lot was $100 000, and it was necessary that the mortgage debt should be increased to pay for it. The old mortgage debt was $55 000, and it was decided to borrow $120 000 additional, so as to provide, after payment in full of the purchase price, $20 000 additional, available for building purposes.

The Society now owns a plot with 75 ft. frontage on 57th Street, with an average depth of 113 ft., for which it has paid $180 000. A conservative estimate of the present market value of this plot (without buildings) is $255 000.

It was not deemed wise to undertake building operations at once, partly on account of the state of the building trade, and partly because the general disorganization incident to such operations would interfere with the comfortable reception of the many Foreign Engineers who were to visit us during the year. The Board has the matter under advisement, general plans are now being prepared and it is expected that the work of enlargement will go on during the next season.

HEADQUARTERS FOR ENGINEERS, AND SOCIETY EXHIBIT AT ST. LOUIS.

In November, 1902, the Board authorized the establishment of an Engineering Headquarters, and an Engineering Exhibit by the Society, at the Louisiana Purchase Exposition, and appointed a Committee, of which Robert Moore, Past-President, Am. Soc. C. E., was Chairman, to take charge of the matter. In 1903, $3 000 was appropriated for the use of this Committee, and during the past year $4 000 additional has been appropriated, making the total expenditure for this account $7 000. The Committee successfully carried out its plans; a handsome booth was erected near the center of the Liberal Arts Building, in which a creditable exhibit, contributed largely by members of this Society, was installed. O. E. Mogensen, M. Am. Soc. C. E., was placed in charge, for the Committee, and during the entire Exposition a bureau of general information and courtesy for visiting engineers was maintained.

LOCAL COMMITTEES OF INFORMATION AND COURTESY TO FOREIGN ENGINEERS.

At the request of the Board, a number of Members in Baltimore, Boston, Chicago, Cincinnati, Cleveland, Harrisburg, Kansas City, Minneapolis, St. Paul, New Orleans, Niagara Falls, Philadelphia, Pittsburg, St. Louis, San Francisco and Washington, kindly consented to act as Committees, and as individuals, for the purpose of

aiding foreign engineers to secure local information while traveling in the United States, to or from the St. Louis Exposition. Each foreigner who called at the Society House was given a general letter of introduction to our Members, to which were appended the names and addresses of the 102 Members above referred to. This plan was very successful, because it made it certain that the visitor to any of the cities named, would be able to find a Member of the Society who would be ready to give him full local information.

The thanks of the Society are due to all the Members who assisted in this manner in the reception of our guests.

VISIT OF MEMBERS OF THE INSTITUTION OF CIVIL ENGINEERS.

The visit of a party of Members of the Institution of Civil Engineers, including the President, Sir William H. White, and the Secretary, Dr. J. H. T. Tudsbery, furnished an occasion of great interest and pleasure to all members of the Society who were able to meet them, either in New York or during their subsequent travels in this country. Their presence at the International Engineering Congress added much to the success of that meeting. A detailed description of the entertainment in New York has been printed in *Proceedings,* and it is only necessary here to add, for the information of members, that the funds of the Society were not drawn upon for this account, the necessary expense having been oversubscribed, and 55% of his subscription having been returned to each subscriber.

INTERNATIONAL ENGINEERING CONGRESS.

In September, 1903, in response to the request of the Authorities of the Louisiana Purchase Exposition, the Board recommended to them a Committee of representative Engineers, to be charged with the organization of an International Engineering Congress, to be held during the Exposition. Such a Committee was appointed, and made every possible effort to secure the co-operation of the American Society of Mechanical Engineers, the American Institute of Mining Engineers, the American Institute of Electrical Engineers, the Society of Naval Architects and Marine Engineers, the Society for the Promotion of Engineering Education and of those Departments of the United States Government in charge of engineering work. The American Society of Mechanical Engineers and the American Institute of Electrical Engineers, however, declined to co-operate in the project, and the Committee reported to the Authorities of the Exposition its inability to organize the proposed Congress. So much time was consumed in the above negotiations that the report of this action of the Committee did not reach the Board until December 1st, 1903.

On January 5th, 1904, the Board decided to undertake, in the name of the Society, the entire organization, financing and management of an International Engineering Congress, and fixed October 3d to 8th as the date at which it should be held. The original Committee, of which Henry S. Haines, M. Am. Soc. C. E., was Chairman, was appointed to take entire charge, in behalf of the Society.

It will be seen that a period of less than nine months was available to carry out the plan of the Committee, made several months before, and, in view of the fact that that plan called for the advance publication and international circulation of papers on selected subjects, to be written by specialists both at home and abroad, none of whom had then been selected, the task seemed almost hopeless. Those who were fortunate enough to attend the Congress, or who have read the lists of Subjects and Authors issued from time to time, and the reports of the two general meetings containing the reports of the Chairmen of the various Sections, and of the Secretary of the Congress,* will understand the feeling with which the Board congratulates the Society and the Profession of Civil Engineering, on the result. The great success of the Congress could not have been achieved but for the prompt and courteous response of the 45 foreign engineers to whom invitations to prepare papers were sent in the name of this Society, and the thanks of the Profession are due to them, as well as to the 52 Americans who accepted similar invitations.

Prior to the date of the Congress 82 papers (a large number of which had to be translated) had been received, prepared for the press, and in advance form, through the agency of Engineering Societies both at home and abroad, placed in the hands of those best qualified to discuss them. The papers were not read at the Congress, but 99 written communications, covering nearly every subject under consideration, had been received and served to introduce the oral discussion. Since the date of the Congress 23 additional written communications have been received. Full details of the attendance, number of meetings, papers, etc., at the Congress have already been published.

The Board wishes here to express its appreciation of the faithful and successful work performed by the regular staff of the Society, in connection with the Congress, without which it would have been impossible to have accomplished such a result. The ordinary work of the Society has gone on as usual, there having been no interruption of the regular issues of *Proceedings, Transactions,* Blue Lists, Ballots, etc.; the regular semi-monthly meetings, with the exception of that for October 1st, have been held; and, in addition to this, for a period of 4 months or more, additional engineering

* *Proceedings*, November, 1904.

papers averaging more than 10 000 words each, many of them illustrated, were issued in advance form at the rate of three papers every four days.

The work of preparing discussions is now in progress, is as well advanced as could be expected, and it is hoped to have the whole Congress Publication ready for issue during the next six months.

FINANCES.

The attention of Members is invited to the Secretary's statement of receipts and disbursements, and to the general balance sheet which accompanies it, in which the very satisfactory financial condition of the Society appears. That condition may be emphasized by pointing out that, although there has been no change in the regular work or literary output, as stated elsewhere in this Report, and although there has been paid an additional interest charge of $3 243.61, due to the increased mortgage debt, and an extraordinary expenditure of $17 579.27 on account of the St. Louis Headquarters and the International Engineering Congress, the balance on hand at the end of the fiscal year (after deducting $18 034.22 cash received on account of new mortgage) is $5 002.73 greater than it was one year ago.

The reports of the Secretary and the Treasurer are appended.

By order of the Board of Direction.

CHAS. WARREN HUNT.
Secretary.

NEW YORK, January 3d, 1905.

GENERAL BALANCE SHEET, DECEMBER 31st, 1904.

ACCOMPANYING THE REPORT OF THE SECRETARY.

ASSETS.		
Three Lots (estimated value)		$255 000.00
Society Building (cost)		103 597.83
Furniture (cost)		16 333.44
Publications on hand (inventoried cost, value)		15 391.11
Library:		
Cash expended for Books, etc.	$9 533.46	
Donations, estimated value.	44 760.06	
		54 293.52
Due from Members	$2 064.73	
" " Non-Members	340.33	
		2 405.06
Cash		49 927.49
		$496 948.45

LIABILITIES.		
Dues for 1905, paid in advance		$16 639.30
Mortgage Debt		175 000.00
*Funds invested in Society House, Lots and Library.	$26 405.78	
Surplus	278 903.37	
		305 309.15
		$496 948.45

* These Funds have been derived from the following sources:

Norman Medal Fund	$1 000.00
Rowland Prize Fund	1 222.50
Collingwood Prize Fund	1 000.00
McCrea Swift Fund	1 000.00
Herbert Stewart Library Fund	1 940.00
Fellowship Fund	13 038.28
Compounding Dues Fund	7 205.00
	$26 405.78

The Norman Medal, Rowland Prize and Collingwood Prize Funds no longer exist as such, the obligations under them having been assumed by the Society, with the consent of the donors.

REPORT OF THE SECRETARY, FOR THE

To the Board of Direction of the

Gentlemen:—I have the honor to present a statement of Re-
December 31st, 1904. I also append a general balance sheet show-
New York, January 3d, 1905.

Receipts.

Balance on hand December 31st, 1903, in Bank, Trust Company and in hands of Treasurer		$26 890.54
Entrance Fees	$8 275.00	
Current Dues	35 684.24	
Past Dues	1 210.00	
Advance Dues	16 639.30	
Certificates of Membership	354.75	
Badges	1 715.30	
Sales of Publications	2 660.97	
Advertisements	30.00	
Interest	1 156.13	
Compounding Dues	840.00	
Library	83.70	
Annual Meeting	480.00	
Binding	3 271.48	
Bond and Mortgage	175 000.00	
Entertainment of British Engineers	2 243.75	
International Engineering Congress	2 615.15	
Miscellaneous	49.23	
		252 489.00
		$279 379.54

YEAR ENDING DECEMBER 31ST, 1904.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

ceipts and Disbursements for the fiscal year of the Society, ending ing the condition of the affairs of the Society.

Respectfully submitted,

CHAS. WARREN HUNT,
Secretary.

DISBURSEMENTS.

Salaries of Officers	$8 475.00	
Clerical Help	11 101.88	
Caretaking	1 770.36	
Publications	13 028.11	
Postage	3 541.01	
General Printing and Stationery	1 963.01	
Badges	1 429.85	
Certificates of Membership	193.80	
Binding	1 774.94	
Library	976.43	
Maintenance of House	263.08	
Heat, Light and Water	1 097.36	
Betterments	37.00	
Furniture	100.80	
Annual Meeting	933.36	
International Engineering Congress	13 579.27	
Prizes	111.00	
Advertising Commissions	18.52	
Interest and Insurance	5 933.61	
Bond and Mortgage	55 000.00	
Entertainment of British Engineers	2 151.25	
Building and Lot	101 095.50	
Current Business	689.93	
Louisiana Purchase Exposition	4 000.00	
Petty Expenses	186.98	
		$229 452.05
Balance on hand December 31st, 1904:		
In Union Trust Company	$42 448.35	
In Garfield National Bank	6 494.14	
In hands of Treasurer	985.00	
		49 927.49
		$279 379.54

REPORT OF THE TREASURER.

In compliance with the provisions of the Constitution, the Treasurer presents the following report for the year ending December 31st, 1904:

Balance on hand December 31st, 1903		$26 890.54
Receipts from current sources, January 1st to December 31st, 1904		72 630.10
Extraordinary receipts on account of Additional Mortgage		175 000.00
Extraordinary receipts on account of Inter. Eng. Congress and Entertainment of British Engineers		4 858.90
Payments on audited vouchers for current business, January 1st to December 31st, 1904	$53 626.03	
Extraordinary expenses on account of Purchase of Lot and Paying off old Mortgage	156 095.00	
Extraordinary expenses on account of International Engineering Congress, St. Louis Exhibit and Headquarters, and Entertainment of British Engineers	19 730.52	
Balance on hand December 31st, 1904:		
In Union Trust Company...$42 448.35		
In Garfield National Bank.. 6 494.14		
In hands of Treasurer..... 985.00		
	49 927.49	
	$279 379.54	$279 379.54

Respectfully submitted,

JOS. M. KNAP,
Treasurer, Am. Soc. C. E.

New York, January 3d, 1905.

ACCESSIONS TO THE LIBRARY.

DECEMBER 14TH, 1904, TO JANUARY 10TH, 1905.

DONATIONS.*

PRODUCER GAS.

A Sketch of the Properties, Manufacture and Uses of Gaseous Fuel. By Humboldt Sexton. Cloth, 9 x 6 in., 8 + 214 + 6 pp., Illus., Manchester, The Scientific Publishing Company. 10 shillings net.

In 1902 the author gave a course of lectures on producer gas at the Technical College, Glasgow, and it was requested that they be published. This little book is based on the notes of the lectures. The author states that special attention has been given to the principles on which the production of gaseous fuel depends, as once these are mastered the practical questions as to the best form and design of producer are quite simple. Typical producers have been described, and in an appendix some of the latest forms. Patented gas producers are numerous, and many of them involve no new principle or even important improvement in detail, but it is advantageous to the student and the practical man to know what has been done. Many important branches are not touched—as, for instance, domestic heating—as to have dealt with them satisfactorily would have increased the size of the book far beyond what is desirable. For the same reason other topics are dealt with very briefly. There is an index of six pages.

ORDINARY FOUNDATIONS.

Including the Coffer-Dam Process for Piers with Numerous Practical Examples from Actual Work. By Charles Evan Fowler, M. Am. Soc. C. E. Second Edition, Revised and Enlarged. Cloth, 9 x 6 in., illus, 26 + 314 pp. New York, John Wiley & Sons. London, Chapman & Hall, Limited, 1905. $3.50.

The preface states that it is hoped in enlarging the field covered by "The Coffer-Dam Process for Piers," the book will be more valuable for the practical engineer, besides giving a sufficiently general treatment to make it valuable for class work. The necessity for a second edition has rendered it possible to make additions to the text, by which the subject of ordinary foundations is more comprehensively covered. The construction of piers by the use of metal cylinders; with timber caissons by open dredging; and the construction of foundations of ordinary size by the use of pneumatic caissons, has furnished another chapter. A chapter has been added which covers the bearing capacity of soils. The new chapter on building stone, masonry and the design of piers is intended to supplement the old chapter on the "Location and Design of Piers." New matter has been added on cement and concrete, which includes tables giving the quantity of material required for concrete of different proportions. The building of piers and pile bents and timber preservation have been discussed. There is an index of seventeen pages.

Gifts have also been received from the following:

Altoona—City Clerk. 1 bd. vol.
Am. Ceramic Soc. 1 vol.
Am. Inst. of Min. Engrs. 1 pam.
Am. Street Ry. Assoc. 1 pam.
Arizona Univ.—Agri. Exper. Station 1 pam.
Carpenter, L. G. 1 pam.
Conn. R. R. Commrs. 1 bd. vol.
Cornell Univ. Lib. 1 pam.
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Eidlitz, Marc & Son. 1 bd. vol.
Farley, G. P. 12 vol.
Fisk, W. L. 2 pam., 4 maps.
Illinois Steel Co. 2 pams.
Inst. of Civ. Engrs. 1 bd. vol., 1 pam.
Liverpool—Engr. of Water Works. 1 pam.
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Maryland Geol. Surv. 6 bd. vol., 1 pam.
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Mass.—State Board of Health. 1 bd. vol.
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Moore, Robert. 1 pam.
New Haven—Shell-Fish Comm. 1 pam.
New South Wales—Govt. Statistician. 9 bd. vol.
New South Wales—Ry. Commrs. 1 bd. vol.
New York City Record. 3 bd. vol.
N. Y. Univ. 1 vol.
Ohio.—Geol. Surv. 1 bd. vol.
Royal Phil. Soc. of Glasgow. 21 vol.
Seafert, Wm. 1 pam.
Sperry, H. M. 2 bd. vol., 22 pam.
Thayer School of Civ. Eng. 1 pam.
Timonoff, V. E. 1 vol.
Tonindustrie Zeitung. 1 bd. vol., 2 vol.
Union Switch and Signal Co. 1 pam.

* Unless otherwise specified, books in this list have been donated by the publishers.

U. S. Bureau of Statistics. 1 vol.
U. S. Coast and Geodetic Survey. 1 pam.
U. S. Div. of Foreign Markets. 1 pam.
U. S. Engrs. School of Application. 2 pam.
U. S. Geol. Surv. 1 bd. vol., 6 vol., 1 pam.
U. S. Interstate Commerce Comm. 1 pam.
U. S. Library of Congress. 1 bd. vol.
U. S. Navy Dept. 10 pam.
Univ. of Texas Mineral Surv. 2 vol.
Unknown. 13 bd. vol., 5 pam
Western Australia—Commr. of Rys. 1 pam.

BY PURCHASE.

Mineral Industry during 1903. Vol. 12. Founded by R. P. Rothwell. Prepared by the Editorial Staff of *The Engineering and Mining Journal.* The Work on this Volume has been more Particularly under the Supervision of D. H. Newland. New York, *Engineering and Mining Journal,* 1904.

Elektrotechnik in Einzeldarstellungen. Heft V. Die Asynchronen Drehstrommotoren ihre Wirkungsweise, Prüfung und Berechnung. Von Gustav Benischke. Braunschweig. Friedrich Vieweg und Sohn, 1904.

Journal of Gas Lighting. Vols. 85-88. London, Walter King, 1904.

SUMMARY OF ACCESSIONS.

December 14th, 1904, to January 10th, 1905.

Donations (including 14 duplicates)	165
By purchase	3
Total	168

MEMBERSHIP.

ADDITIONS.

MEMBERS.

		Date of Membership.
Fortin, Sifroy Joseph. Representing Milliken Bros., Apartado 2019, City of Mexico, Mexico.	Assoc. M. M.	Nov. 6, 1895 Dec. 6, 1904
Gardner, William Montgomery. U. S. Asst. Engr., U. S. Engr.'s Office, Memphis, Tenn.		Dec. 7, 1904
Hatch, James Noble. Structural Engr. with Sargent & Lundy, 1720 Railway Exchange, Chicago, Ill.		Dec. 7, 1904
Merritt, David Spencer. 10 N. Broadway, Tarrytown, N. Y.		Jan. 4 1905
Nuebling, Emil Louis. Supt. and Engr., Dept. of Water, Reading, Pa.		Dec. 7, 1904
Van Cleve, Aaron Howell. Res. Engr., The Niagara Falls Power Co. and allied companies, Niagara Falls, N. Y.; Res. Engr., Canadian Niagara Power Co., Niagara Falls, Ont.; Address, Niagara Falls, N. Y.	Jun. Assoc. M. M.	May 31, 1892 Dec. 5, 1894 Nov. 1, 1904
Wallace, Harold Ulmer. Chf. Engr., Ill. Cent. R. R., Hotel Windemere, 56th and Cornell Ave., Chicago, Ill.		Dec. 7, 1904
Watson, Wilbur Jay. Bridge Engr., The Osborn Eng. Co., Osborn Bldg., Cleveland, Ohio.	Jun. Assoc. M. M.	Oct. 4, 1898 Jan. 2, 1901 Jan. 3, 1905
Wheeler, Edgar True. 661 Pacific Elec. Bldg., Los Angeles, Cal.		Dec. 7. 1904
Wilson, Everett Broomall. Secy. and Treas. of The Am. Bureau of Inspection and Tests, Monadnock Blk., Chicago (Res., 1408 Dempster St., Evanston), Ill.	Assoc. M. M.	Mar. 4, 1903 Dec. 6, 1904

ASSOCIATE MEMBERS.

Barnes, Fred Asa. Instr. in Civ. Eng., Cornell Univ., 324 Huestes St., Ithaca, N. Y.		Dec. 7, 1904
Keim, Warren Byron. 129 N. 4th St., Harrisburg, Pa.		Jan. 4, 1905
Lucas, George Latimore. Res. Engr., Castlegould, Port Washington, D. C.		Dec. 7, 1904
Scheuermann, Hugo Julius. Bridge Designer, Barge Canal Office, Albany, N. Y.		Dec. 7, 1904
Tucker, Herman Franklin. Room 1107, Exchange Bldg., Boston, Mass.		Dec. 7, 1904
Turner, Willis Tubbs. Box S, Salt Lake City, Utah.		Dec. 7, 1904
White, Frank George. Chf. Draftsman. Office of City Engr., Salt Lake City, Utah.	Jun. Assoc. M.	Dec. 3, 1901 Dec. 7, 1904

	Date of Membership.
WRIGHT, JOSEPH. Wyanet, Ill.	Dec. 7, 1904
ZORN, GEORGE WASHINGTON. Cody, Wyo.	Dec. 7, 1904

JUNIORS.

BROWN, ALFRED THOMAS. 2005 Washington Ave., New York City.	Nov. 1, 1904
EDWARDS, DEAN GRAY. 430 West 118th St., New York City.	Nov. 1, 1904
GODDARD, HERBERT WILLARD. Technology Club, 36 East 28th St., New York City.	Jan. 3, 1905
HANAVAN, WILLIAM LAWRENCE. 430 West 118th St., New York City.	Dec. 6, 1904
HOWE, HARRY NORTHROP. U. S. Engr. Office (Box 204), Memphis, Tenn.	Dec. 6, 1904
SPENCER, HERBERT. Div. Engr.'s Office, Syracuse, N. Y.	Feb. 2, 1904
WALKER, GEORGE JOHNSON. Draftsman with Am. Bridge Co., 316 Thorn St., Sewickley, Pa.	Dec. 6, 1904

RESIGNATIONS.

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ANDERSON, LATHAM	Dec. 31, 1904
BOEHMER, MAX.	Dec. 31, 1904
TAYLOR, NORTON LONGSTRETH	Dec. 31, 1904

ASSOCIATE MEMBERS.

DESPARD, DUNCAN LEE	Dec. 31, 1904
NOYES, HARRY LINCOLN	Dec. 31, 1904

JUNIORS.

BRISLEY, EDWARD BETTS	Dec. 31, 1904
HALL, FREDERIC FRANCIS	Dec. 31, 1904
HOPKINS, GEORGE GALLAGHER, JR.	Dec. 31, 1904

DEATHS.

CROSBY, WILSON	Elected Member, September 15th, 1869; died December 18th, 1904.
CUNNINGHAM, JOHN MILLER	Elected Associate Member, October 7th, 1903; died August 8th, 1904.
MYERS-BESWICK, WILLIAM BESWICK	Elected Member, January 3d, 1894; died December 27th, 1904.
LOOKER, HENRY BRIGHAM	Elected Associate Member, May 3d, 1893; died January 3d, 1905.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(December 12th, 1904, to January 7th, 1905.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings*, Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
(7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine*, New York City, 25c.
(10) *Cassier's Magazine*, New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News*, New York City, 15c.
(14) *The Engineering Record*, New York City, 12c.
(15) *Railroad Gazette*, New York City, 10c.
(16) *Engineering and Mining Journal*, New York City, 15c.
(17) *Street Railway Journal*, New York City, 35c.
(18) *Railway and Engineering Review*, Chicago, Ill., 10c.
(19) *Scientific American Supplement*, New York City, 10c.
(20) *Iron Age*, New York City, 10c.
(21) *Railway Engineer*, London, England, 25c.
(22) *Iron and Coal Trades Review*, London, England, 25c.
(23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal*, New York City, 10c.
(25) *American Engineer*, New York City, 20c.
(26) *Electrical Review*, London, England.
(27) *Electrical World and Engineer*, New York City, 10c.
(28) *Journal*, New England Water-Works Assoc., Boston, $1.
(29) *Journal*, Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
(31) *Annales de l'Assoc. des Ing. Sortis des Ecole Speciales de Gand*, Brussels, Belgium.
(32) *Memoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
(33) *Le Genie Civil*, Paris, France.
(34) *Portefeuille Economique des Machines*, Paris, France.
(35) *Nouvelles Annales de la Construction*, Paris, France.
(36) *La Revue Technique*, Paris, France.
(37) *Review de Mecanique*, Paris, France.
(38) *Revue Generale des Chemins de Fer et des Tramways*, Paris, France.
(39) *Railway Master Mechanic*, Chicago, Ill., 10c.
(40) *Railway Age*, Chicago, Ill., 10c.
(41) *Modern Machinery*, Chicago, Ill., 10c.
(42) *Transactions*, Am. Inst. Elect. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussées*, Paris, France.
(44) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals*, Scranton, Pa., 20c.
(46) *Scientific American*, New York City, 8c.
(47) *Mechanical Engineer*, Manchester, England.
(48) *Zeitschrift*, Verein Deutscher Ingenieure, Berlin, Germany.
(49) *Zeitschrift für Bauwesen*, Berlin, Germany.
(50) *Stahl und Eisen*, Düsseldorf, Germany.
(51) *Deutsche Bauzeitung*, Berlin, Germany.
(52) *Rigasche Industrie-Zeitung*, Riga, Russia.
(53) *Zeitschrift*, Oesterreichischer Ingenieur und Architekten Verein, Vienna, Austria.
(54) *Transactions*, Am. Soc. C. E., New York City, $5.

(55) *Transactions,* Am. Soc. M. E., New York City, $10.
(56) *Transactions,* Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian,* London, England.
(58) *Proceedings,* Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions,* Mining Inst. of Scotland, London and Newcastle-upon-Tyne, England.
(60) *Municipal Engineering,* Indianapolis, Ind., 25c.
(61) *Proceedings,* Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World,* 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings,* Inst. C. E. London, England.
(64) *Power,* New York City, 20c.
(65) *Official Proceedings,* New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting,* London, England, 15c.
(67) *Cement and Engineering News,* Chicago, Ill., 25c.
(68) *Mining Journal,* London, England.
(69) *Mill Owners,* New York City, 10c.
(70) *Engineering Review,* New York City, 10c.
(71) *Journal,* Iron and Steel Inst., London, England.
(72) *Street Railway Review,* Chicago, 30c.
(73) *Electrician,* London, England, 18c.
(74) *Transactions,* Inst. of Min. and Metal., London, England.
(75) *Proceedings,* Inst. of Mech. Engrs., London, England.
(76) *Brick,* Chicago, 10c.
(77) *Journal,* Inst. Elec. Engrs., London, England.
(78) *Beton und Eisen,* Vienna, Austria.
(79) *Forscherarbeiten,* Vienna, Austria.
(80) *Tonindustrie-Zeitung,* Berlin, Germany.
(81) *Zeitschrift fur Architektur und Ingenieurwesen.* Wiesbaden, Germany.
(82) *Dinglers Polytechnisches Journal,* Berlin, Germany.

LIST OF ARTICLES.

Bridge.

The Jubilee Bridge over the River Hooghly.* Kenneth Smale Laurie. (63) Vol. 158.
Axle-Loads on Railway Bridges.* John Graham. (63) Vol. 158.
Maximum Bending-Moment in a Girder under a Moving Group of Loads.* Evelyn Henry Young. (63) Vol. 158.
Concrete-Steel Arches on the Indianapolis Northern Traction Lines.* (72) Dec.
The Erection of the New Ferry Bridge at Duluth, Minn.* (13) Dec. 15; (46) Dec. 24.
The Anchorages for the Manhattan Bridge at New York City.* (15) Dec. 16; (14) Dec. 17; (13) Dec. 22.
Scherzer Bridge for the Newburgh & South Shore.* (15) Dec. 16; (40) Dec. 16.
The Cuyahoga River Rolling-Lift Bridge.* (14) Dec. 17.
The Schell Memorial Bridge.* (14) Serial beginning Dec. 17.
Rapid Railway Trestle Building. A. S. Zinn. (14) Dec. 17.
Details at the Pivot Pier and Ends of the Merrimac River Drawbridge, Newburyport, Mass.* (14) Dec. 17.
Concrete-Steel Bridge at Piano, Ill.; Chicago, Burlington & Quincy Ry.* (13) Dec. 22.
The Erection of the Rondout Bridge.* (14) Dec. 24.
The Expansion Joints of the Thebes Bridge.* (14) Dec. 24.
The Illumination of the Williamsburg Bridge, New York City.* (27) Dec. 24.
Erecting a Plate Girder Bridge With a Gin Pole.* J. W. Philips. (15) Dec. 30.
Tie for Concrete Forms.* M. H. M'Gee. (15) Dec. 30.
The Proposed Hendrik Hudson Memorial Bridge.* (14) Dec. 31.
The Stone Bridge at Hartford, Conn.* (14) Dec. 31.
A Skew-Arch of Concrete Steel. (60) Jan.
The Charleston Bridge Failure.* H. G. Tyrrell. (13) Jan. 5.
The New Newark Bay Bridge: A Tandem Scherzer Rolling Lift Bridge.* S. D. V. Burr. (20) Jan. 5.
A Difficult Piece of Bridge Erection in Connection with Terminal Improvements of the New York Central & Hudson River R. R. Co.* Frank C. Shepherd, Assoc. M. Am. Soc. C. E. (13) Jan. 5.
Allgemeine Berechnung der Normal- und Schubspannungen in Trägern aus Eisenbeton.* Dr. Saliger. (78) Pt. 5, 1904.
Dimensionierung der T-förmigen Träger.* Max R. v. Thullie. (78) Pt. 5, 1904.
Bogenbalken, System Thrul.* Fritz v. Emperger. (78) Pt. 5, 1904.
Einige Besondere Arten von Brückenträgern.* V. v. Friedrichs. (52) Nov. 30.
Beitrag zur Berechnung der Querrahmen Elsener Brücken.* F. Brunner. (53) Dec. 9.
Versuche mit Sandsteinquadern zu Brückengelenken.* C. Bach. (48) Dec. 17.
Zum Wettbewerb zur Erlangung von Entwürfen für die Neue Rheinbrücke bei Ruhrort.* (51) Serial beginning Dec. 21.

* Illustrated.

Electrical.

A Notable Electric Power Station.* (8) Oct.
A Protest on Behalf of Wattless Current.* E. J. Willis. (8) Oct.
Switchboard Design.* A. S. Loizeaux. (8) Oct.
Deltabeston Magnet Wire. (72) Dec.
Problems of Heavy Electric Traction.* O. S. Lyford, Jr., and W. N. Smith. (42) Dec.
The Maximum Distance to Which Power can be Economically Transmitted.* Ralph D. Mershon. (42) Dec.
Electric Power Distribution in South Wales.* (73) Serial beginning Dec. 2.
Two Scottish Electric Power Schemes.* (73) Dec. 2.
Electric Power at the *Scotsman* Offices. (73) Dec. 2.
Comparative Designs for a 10-KW Dynamo.* J. W. Burleigh. (26) Dec. 9.
Pietermaritzburg (Natal) Electric Lighting and Tramways.* (26) Dec. 9.
Some New Electricity Meters.* (73) Dec. 9.
The Home Office Draft Regulations for the Use of Electricity in Factories and Workshops. Frank Broadbent, M. I. E. E. (26) Dec. 9.
The "Megger." (73) Dec. 9.
Proposed Electrification of Railways in South Australia. (73) Dec. 9.
An Electrolytic Wireless Telegraph Detector.* James E. Ives. (27) Dec. 10.
The Predetermination of Plunger Electromagnets.* Silvanus P. Thompson. (Paper presented at the International Elec. Cong.) (27) Dec. 10.
The Chicago Telephone Company's "Juice Wagon."* (27) Dec. 10.
The Pollak-Virag Rapid Telegraph.* (12) Dec. 16; (47) Dec. 17.
The Magnetic Resistance of Air-Gaps.* G. Benischke. (From *Electrotechnische Zeitschrift.*) (26) Dec. 16.
The Dielectric Strength of Certain Specimens of Mica.* Ernest Wilson and W. H. Wilson. (73) Dec. 16.
Notes on Experiments with Transformers for Very High Potentials.* Harold B. Smith. (Abstract of Paper read before the International Elec. Cong.) (73) Dec. 16.
Loaded Telephone Lines in Practice.* Hammond Vinton Hayes. (Paper read before the International Elec. Cong.) (73) Dec. 16.
The St. Louis Exhibition: The Exhibits of the Allis-Chalmers-Bullock Companies. (11) Dec. 16.
The Advantages of the Electric Drive.* D. N. Dunlop. (22) Dec. 16.
General Proportions of the Mechanical Equipment of the Arthur Building, New York.* (14) Dec. 17.
The Power Plant of the Oliver Building, Boston. Howard S. Knowlton. (14) Dec. 17.
The Manufacture of Carbons in England.* Frank C. Perkins. (19) Dec. 17.
Typical New Telephone Building at Newton, Mass. (27) Dec. 17.
Simple German Instruments for Testing the Magnetic Properties of Iron.* (19) Dec. 17.
Development of Electric Power Behind Niagara Falls.* (27) Dec. 17.
Fundamental Principles of Power Equipment for Telephone Exchanges. B. D. Willis. (27) Dec. 17.
Special Methods for Locating Faults on Electric Cables.* Henry W. Fisher. (27) Dec. 17.
On the Theory of the Regulation of Alternators.* C. F. Guilbert. (27) Dec. 17.
Recent Station Equipment of the Worcester Electric Light Co., Worcester, Mass. (27) Dec. 17.
The Combination of Dust Destructors and Electricity Works Economically Considered.* Frank Broadbent. (26) Dec. 23.
Some New Switches and Fuses.* (26) Dec. 23.
Motor Speed Controller.* (12) Dec. 23.
Water-Power *v.* Steam-Power in the British Isles. E. Ristori, Assoc. M. Inst. C. E. (11) Dec. 23.
The Charging of a Cable Through a Condenser and Resistance. Oliver Heaviside. (73) Dec. 23.
Hydro-Electric Power Plant at Turbigo. (12) Dec. 23.
60-Ton Electric Travelling-Crane.* (11) Dec. 23.
The Lighting of Warehouses.* (40) Dec. 23.
Design of Alternators.* A. Press. (26) Dec. 23.
Simultaneous Telegraphy and Telephony. Joseph Hollos. (Paper presented before the International Elec. Cong.) (19) Dec. 24.
The Haschke Compound Storage Battery.* (46) Dec. 24.
New Telephone Exchange at Somerville, Mass. (27) Dec. 24.
Limitations to the Use of Storage Batteries: an English Engineer's Views. H. M. Hobart, M. I. E. E. (From *Technics.*) (19) Dec. 24.
The Erection of a 180-Foot Mast for Wireless Telegraphy and Telephony.* Joseph B. Baker (27) Dec. 24.
The Power Factor Indicator.* Harry W. Richardson. (27) Dec. 24.
Efficiency of Compound-Wound, Direct-Current Generators.* V. D. Moody. (27) Dec. 24.
St. Joseph River Power Development.* (27) Dec. 31.

* Illustrated.

Electrical—(Continued).

Some Latest Features of Automatic Telephony.* Norman G. Meade. (27) Dec. 31.
Morgan's Falls, Ga., Transmission Plant.* Lamar Lyndon. (27) Dec. 31.
Completion of the Janesville Transmission Plant. (27) Dec. 31.
Slaby's New Indicator for Wireless Telegraphy. (46) Dec. 31.
A Generating Set Embracing New Features.* (17) Dec. 31.
The Municipal Conduit System of Erie, Pa.* Benjamin E. Briggs. (60) Jan.
Repairing Commutators.* Norman G. Meade. (64) Jan.
Pioneer Work in High-Tension Electric Power Transmission: The Operations of the Telluride Power Company.* P. N. Nunn. (Paper read before the International Elec. Cong.) (10) Jan.
Barrages-Réservoirs et Services Electriques de la Ville de Solingen (Prusse Rhénane).* A. Bidault des Chaumes. (33) Dec. 3.
Emploi du Courant Electrique pour Dégeler les Conduites d'Eau.* (33) Dec. 3.
Versuche an Wasserhaltungen.* Baum and Hoffmann. (Report of the Investigation Committee.) (48) Serial beginning Dec. 3.
Neuere Schmelzsicherungen.* (82) Serial beginning Dec. 3.

Marine.

Recent Developments in Cargo and Intermediate Steamers.* Edwin William De Rusett. (63) Vol. 158.
One of Japan's Dock Yards.* (8) Oct.
Microscopic Observations on Naval Accidents.* Thomas Andrews, M. Inst. C. E. (11) Serial beginning Dec. 2.
The Italian Battleship *Vittorio Emanuele III.** (12) Dec. 9.
Simple Methods in Warship Design a Necessity. George W. Dickie. (Abstract of Paper read before the Soc. of Naval Archts. and Marine Engrs.) (11) Dec. 9.
Sea-Going Battleships. William Hovgaard. (Abstract of Paper read before the Soc. of Naval Archts. and Marine Engrs.) (11) Dec. 16.
Some Recent Experiments at the United States Model Basin.* D. W. Taylor. (Abstract of Paper read before the Soc. of Naval Archts. and Marine Engrs.) (11) Dec. 16.
Battleships *Idaho* and *Mississippi*. (46) Dec. 17.
Recent Practice in Launching Warships in the United States. (Abstracts of Papers read before the Soc. of Naval Archts. and Marine Engrs.) (13) Dec. 22.
Electric Coal-Whip.* (11) Dec. 23.
The New Warships for the British Navy. (19) Dec. 24.
A New Offshore Floating Dock.* (19) Dec. 31.
Coaling at Sea. P. C. Ferguson. (From *Tech. World.*) (24) Jan. 2.
The Turbine-Driven Steamer *Manxman.** Emile Guarini. (45) Jan. 2.
Versuche zur Ermittlung des Einflusses der Wassertiefe auf die Geschwindigkeit der Torpedoboote.* Paulus. (Paper read before the Schleswig Holstein Bezirksverein.) (48) Dec. 10.

Mechanical.

Aerial Suspension-Cableways.* John Macdonald Henderson. (63) Vol. 158.
Internal-Combustion Motors.* Dugald Clerk. (63) Vol. 158.
Compressed Air and Its Application in Mechanical Lines. W. O. Duntley. (61) Oct.
The Quality of Exhaust Steam.* C. V. Kerr. (8) Oct.
Description of Well-Known Types of Steam Turbines with Special Reference to the Westinghouse-Parsons. R. N. Ehrhart. (58) Nov.
The Regulation of Gas Engines.* Charles E. Lucke. (65) Nov. 18.
Bog Fuel. Edward Atkinson. (28) Dec.
Belt Conveyers: Suggestions in Regard to Their Use: Principles of Construction and Proper Methods of Caring for Them. J. J. Ridgway. (45) Dec.
Hancock Valves.* (9) Dec.; (27) Dec. 31; (14) Dec. 31; (25) Jan.; (20) Jan. 5; (64) Jan.
Recent Safety Appliances for Cotton Mules. J. H. Crabtree. (11) Dec. 2.
The Holden Magnetic Clutch.* (11) Dec. 2.
Gas Engines in Iron and Steel Works. J. H. Hamilton. (Paper read before the Staffordshire Iron and Steel Inst.) (57) Dec. 2; Abstract (22) Dec. 2; (47) Dec. 3.
Gaseous Fuel. F. H. Bowman. (Abstract of Lecture before the National Assoc. of Colliery Mgrs.) (22) Dec. 2.
Conveyor at Brimsdown Power House.* (73) Dec. 2.
Engine-Shaft Bearings. William Turner. (Abstract of Paper read before the Manchester Assoc. of Engrs.) (47) Dec. 3.
A Comparison of Water-Tube Boilers.* W. R. Cummins. (Paper read before the North-East Coast Inst. of Engrs. and Shipbuilders.) (47) Serial beginning Dec. 3; (22) Dec. 2.
Two-Stage Vertical Air-Compressors.* (11) Dec. 9.
250-Horse-Power Gas-Engine. (11) Dec. 9.
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The Relation of the Constants of the Elongation Equation to Contraction of Area.* Archibald Campbell Elliott. (63) Vol. 158.
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Modes of Testing Castings.* W. T. MacCall. (Abstract of Paper read before the British Foundrymen's Assoc.) (22) Dec. 9.
Timber: Its Strength, and How to Test It. T. Hudson Beare. (Lecture before the Dundee Inst. of Engrs.) (11) Dec. 9.
Tests of Grain Pressure in Deep Bins at Buenos Aires, Argentina.* Eckhardt Lufft. (13) Dec. 15.
Armored Concrete in Europe. (From *Bulletin* of the International Ry. Cong.) (40) Dec. 16.
The Development of Shallow and Deep Foundations for Chicago Buildings. (13) Dec. 22.
Chicago & Northwestern Building.* (40) Dec. 23.
The Reinforced Concrete Building of the J. M. Bour Co., Toledo.* George V. Rhines. (14) Dec. 24.
The Strength of Structural Timber. (14) Dec. 24.
What Can Chemical Research Do for the Portland Cement Industry? Clifford Richardson. (Abstract of an Address before the Assoc. of Portland Cement Mnfrs.) (14) Dec. 24.
The Technical Analysis of Cements. S. F. Peckham. (From *Journal* of the Amer. Chem. Soc.) (24) Dec. 26.
A 182-Ft. Chimney of Reinforced Concrete at Bellevue, Mich.* (13) Dec. 29.
Materials which Retard the Setting of Portland Cement. R. C. Carpenter. (14) Dec. 31.
A Steel-Frame Riding Academy Building.* (14) Dec. 31.
The Greek Amphitheater at the University of California: An Instructive Example of the Advantageous Use of Concrete for Reproducing Greek Architecture.* C. W. Whitney. (14) Dec. 31.
The Mechanical Equipment of the Bellevue-Stratford Hotel, Philadelphia.* (14) Serial beginning Dec. 31.
Analysis and Design of a Reinforced Concrete Retaining Wall.* F. F. Sinks. (13) Jan. 5.
Recent Experiments with Materials which Retard the Activity of Portland Cement. R. C. Carpenter, M. Am. Soc. M. E. (From *Sibley Journal of Engineering.*) (13) Jan. 5.
Effect of Calcium Sulphate in Different Forms on the Setting Time of Portland Cement. Richard K. Meade and William P. Gano. (From the *Chemical Engineer.*) (62) Jan. 5.
Sur l'Essai des Métaux par Flexion de Barreaux Entaillés.* G. Charpy. (32) Oct.
Petits Pavillons d'Habitation, à Puteaux et à Suresnes (Seine). E. Rivoalen. (35) Dec.
La Poussée des Terres contre les Murs de Soutènement.* L. Malevé. (30) Dec.
Concours pour le Grand Prix de Rome de 1904.* Emile Beauvalet. (33) Dec. 10.
Das Amphitheater an der Washington Universität in St. Louis.* Ed. Probst. (78) Pt. 5, 1904.
Das Neue Stadttheater in Bern.* (From *Schweizer Bauzeitung.*) (78) Pt. 5, 1904.
Einsturz der Zwischendecken in der Mochowaja-Strasse in St. Petersburg N. A. Shitkewitsch. (Extract from the *Protokolle* of the Petersburg Polytechnische Verein.) (78) Pt. 5, 1904.
Ein Graphischer Nachweis der Tragfähigkeit und Aller in einem Tragwerke aus Eisenbeton Auftretenden Spannungen.* F. v. Emperger. (78) Pt. 5, 1904.
Nachweis des Freien Kalkgehaltes im Portlandzemente. A. Baikoff. (Tr. from the Russian *Zement.*) (80) Serial beginning Dec. 1.
Zur Theorie der Halbringförmigen Balkonträger.* Johann Stutz. (53) Dec. 2.
Ueber Herstellung und Verwendung von Hydraulischem Sackkalk. Ern. Pasquay. (80) Dec. 10.
Einflusslinien für die Beanspruchung Gerader Fachwerkträger durch Horizontale Kräfte.* Wenzel St. Ritter v. Balicki. (53) Dec. 16.
Über das Verhalten von Konstruktionsmaterialien ohne Proportionsgrenze. Bernh. Kirsch. (53) Dec. 16.

Topographical.

Note on Traverse Surveying.* Ponsonby Moore Crosthwaite. (63) Vol. 158.
A Method of Solving a Three-Centered Compound Curve with Transitions.* Sheldon Smillie. (6) Nov.
The Three-Point Problem in Plane-Table Surveying. Antonio Llano. (13) Dec. 29.

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* Illustrated.

Water Supply.

The Barrage across the Nile at Asyût.* George Henry Stephens. (63) Vol. 158.
The Use of Cement Grout at the Delta Barrage in Egypt.* Sir Robert Hanbury Brown. (63) Vol. 158.
Note on Siphon Discharge.* Alexander Welsh. (63) Vol. 158.
The Development of the Water-Supply to the Canterbury Plains, New Zealand. George Phipps Williams. (63) Vol. 158.
A Notable Electric Power Station.* (8) Oct.
Note on Action of Hydraulic Rams.* A. J. Wood. (8) Oct.
The Water Power at Holyoke. Albert F. Sickman. (28) Dec.
Additional Water Supply for New York City.* Rudolph Hering. (28) Dec.
A Wood-Stave Conduit for the Water Supply of Atlantic City.* Kenneth Allen. (28) Dec.
Some Additional Notes on the Wood-Stave Conduit at Atlantic City, N. J. C. J. Myers. (28) Dec.
The Holyoke Water Supply.* A. M. French. (28) Dec.
Municipal Water Supply Revenue. James L. Tighe. (28) Dec.
Report of Committee (of the New England Water Works Association) on Private Fire Services. (28) Dec.
The Epidemic of Typhoid Fever at Ithaca, N. Y.* George A. Soper. (28) Dec.
The Doulton Water Softener.* (73) Dec. 9.
The Measurement of Running Water in Rivers and Open Channels.* W. H. Wheeler, M. Inst. C. E. (12) Dec. 9.
Richards' Centrifugal Pump.* (47) Dec. 10.
An Example of Flattening of Large Cast-Iron Pipes Under Earth Pressure.* Walter W. Patch. (13) Dec. 15.
Sources and Cost of Power for Pumping Irrigating Water. H. A. Storrs. (Abstract of Paper read before the Irrigation Cong.) (13) Dec. 15.
Notes on Hydraulic Packings and Stuffing Box Design.* Ulrich Peters. (20) Dec. 15.
Shanghai Waterworks.* (12) Dec. 16.
Power Development at Niagara.* (12) Dec. 16.
A New Method for Determining the Color of the Turbidity of Water.* Freeland Howe, Jr. (14) Dec. 17.
Laying a Submerged Water Main at Waterville, Me.* (14) Dec. 17.
The American System of Filtration Plant in Mysore, India: Description of the Works for Supplying the Kolar Gold Field with Potable Water.* Edmund B. Weston, M. Am. Soc. C. E. (14) Dec. 17.
Irrigation in Southern California.* Day Allen Willey. (46) Dec. 17.
Some Large Hydraulic Turbine Installations.* (47) Serial beginning Dec. 17.
Development of Electric Power Behind Niagara Falls.* (27) Dec. 17.
Report on Filtering the Croton Water Supply, New York City. (13) Dec. 22; (14) Dec. 24.
Hydro-electric Power Plant at Turbigo. (12) Dec. 23.
Some Observations of Water Waste in Lakewood, O. Joseph C. Beardsley. (14) Dec. 24.
Thawing Water Mains Electrically.* (14) Dec. 24.
The Rochester and Lake Ontario Water-Works. (14) Dec. 24.
Tidal Water Power: Means of Obtaining a Constant Head of About Thirty-eight Feet. W. S. Cleveland. (46) Dec. 24.
The Longevity of the Typhoid Bacillus in Water.* A Review by George C. Whipple. (14) Dec. 24.
Tests of Irrigation Pumping Plants and Wells in the Valley of the Rio Grande.* Chas. S. Slichter. (13) Dec. 29.
A New Proposal for a Dam Across the Rio Grande, near El Paso, Tex. (13) Dec. 29.
Removal of Sulphuric Acid from Water.* (62) Dec. 29.
The Fairbanks Combined Gasoline Engine and Pump.* (40) Dec. 30.
St. Joseph River Power Development.* (27) Dec. 31.
Morgan's Falls, Ga., Transmission Plant.* Lamar Lyndon. (27) Dec. 31.
The Otto Electric Sterilizer.* (19) Dec. 31.
The Development of Power Pumping Machinery.* Wm. M. Barr. (9) Jan.
Water Softening: Control and Results from a Chemical Standpoint. G. M. Campbell. (25) Serial beginning Jan.
The Largest Water Turbine in Existence.* (46) Jan. 7.
Flexions des Parois dans les Tuyaux de Conduites de Grand Diametre.* C. Birault. (32) Oct.
Etude sur le Fonctionnement des Soupapes de Pompes Chargées par des Ressorts. M. Berg. (Tr. from *Vercin Deutscher Ingenieure.*) (37) Serial beginning Nov.
Etude Comparative des Diverses Formules de l'Ecoulement de l'Eau dans les Tuyaux de Conduites. M. Daries. (35) Dec.
Barrages-Réservoirs et Services Électriques de la Ville de Solingen (Prusse Rhénane).* A. Bidault des Chaumes. (33) Dec. 3.
Versuche an Wasserhaltungen.* Baum and Hoffmann. (Report of the Investigation Committee.) (48) Serial beginning Dec. 3.
Gewölbeförmige Talsperre in Stampfbeton mit Eiseneinlagen.* (51) Dec. 14.

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Die Entwickelung des Tangentialrades in Kalifornien.* Heinrich Homberger. (48) Dec. 17.

Waterways.

Burntisland Harbour: Construction of the East Dock.* Robert Henderson. (63) Vol. 158.

Lowering the Sill of the Ramsden Dock, Barrow-in-Furness.* Leopold Halliday Savile. (63) Vol. 158.

Birmingham Canal Navigations; The Renewal of a Portion of the Invert of Netherton (Canal) Tunnel, 1902.* Charles Henry Nias. (63) Vol. 158.

The British Canals Problem. Arthur Lee. (29) Dec. 2.

Pumping Plant for the New South Dock, Cardiff.* (12) Dec. 9.

Plans for the Panama Canal Work. (13) Dec. 22; (20) Dec. 22.

The Panama Canal: Mr. Wallace's Plans. (18) Dec. 24; (15) Dec. 30.

The Present Aspects of the Panama Canal. Wm. H. Burr. (9) Jan.

The New York Harbor Entrance.* Lewis M. Haupt. (46) Jan. 7.

Le Port d'Alexandrie Historique et Travaux en Cours d'Exécution.* C. Birault. (33) Dec. 10.

Travaux de Protection des Rives du Sutlej aux Abords du Pont Kaiser-i-Hind (Inde Anglaise).* G. Richou. (33) Dec. 17.

Bühnen aus Eisenbeton.* (78) Pt. 5, 1904.

Der Wettbewerb für eine Neue Utobrücke über die Sihl in Zürich.* (78) Serial beginning Pt. 5, 1904.

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* Illustrated.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

FIFTY-SECOND ANNUAL MEETING.*

JANUARY 18TH, 1905.—The meeting was called to order at 10 A. M.; President Charles Hermany in the chair; Charles Warren Hunt, Secretary; and present, also, about 300 members.

The reading of the minutes of the meeting of January 4th was dispensed with.

Messrs. W. H. Coverdale, L. White and B. M. Wagner were appointed tellers to canvass the Ballot for Officers for the ensuing year.

*A full report of the Fifty-second Annual Meeting is printed on pages 59 to 85 of this number of *Proceedings*.

The Annual Report of the Board of Direction and the Annual Reports of the Secretary and of the Treasurer* for the year ending December 31st, 1904, were presented, and, on motion, duly seconded, accepted and placed on file.

A progress report† from the Special Committee on Uniform Tests of Cement was read by the Secretary.

On motion, duly seconded, the report was received, placed on file, and the Committee continued.

A progress report‡ from the Special Committee on Rail Sections was presented by Joseph T. Richards, M. Am. Soc. C. E., Acting Chairman of that Committee.

On motion, duly seconded, the report was received, placed on file, and the Committee continued.

A progress report§ from the Special Committee on Concrete and Steel-Concrete was read by the Secretary.

The Chairman and Secretary of the Special Committee on Concrete and Steel-Concrete presented a request that the name of the Committee be changed to the Special Committee on Concrete and Reinforced Concrete.

On motion, duly seconded, the request was granted.

On motion, duly seconded, the report of the Committee was received, placed on file and the Committee continued.

The following were appointed members of the Nominating Committee for two years:

Charles L. Harrison....	*Representing*	*District*	*No.*	*1.*
John R. Freeman.....	"	"	"	*2.*
Charles F. Stowell....	"	"	"	*3.*
James K. Lyons.....	"	"	"	*4.*
C. F. Loweth.....	"	"	"	*5.*
J. A. L. Waddell.....	"	"	"	*6.*
J. D. Isaacs.....	"	"	"	*7.*

The following resolution was presented by Samuel Whinery, M. Am. Soc. C. E., and duly seconded:

"(1) *Whereas,* It has been at times in the past, and may be in the future, suggested that members to serve on technical or other commissions, or to render special professional services, be nominated by the American Society of Civil Engineers, and

"(2) *Whereas,* No provision now exists in the Constitution or rules of the Society authorizing and governing the making of such nominations.

"(3) *Whereas,* It is proper and desirable that the attitude of the Society in reference to making such nominations shall be determined and expressed; therefore,

*The Annual Reports of the Board of Direction, the Secretary and the Treasurer may be found on pages 10 to 22 of the *Proceedings* for January, 1905 (Vol. XXXI).

†See page 59.

‡See page 59.

§See page 60.

"*Resolved*, That the Board of Direction be requested to consider the propriety and advisability of the Society making such recommendations or nominations from among its own members, or others, for special positions or services; to take measures, if they shall deem it advisable, to ascertain the views of the membership on the subject; and to submit to the next Annual Convention its conclusions and recommendations in the matter."

After discussion, the resolution was adopted.

The Secretary reported that the Board of Direction had awarded the prizes for the year ending with the month of July, 1904, in accordance with the recommendations of the Committee appointed for that purpose, as follows:

That the Norman Medal be awarded to Paper No. 971, "The Breakwater at Buffalo, New York," by Emile Low, M. Am. Soc. C. E.

That the Thomas Fitch Rowland Prize be awarded to Paper No. 970, "Dock Improvements at Liverpool," by George Cecil Kenyon, Assoc. M. Am. Soc. C. E.

That the Collingwood Prize be awarded to Paper No. 976, "The Substructure of Marsh River Bridge," by Herbert J. Wild, Jun. Am. Soc. C. E.

The Secretary announced the election, by the unanimous vote of the Board of Direction and of all living Past-Presidents, of the following as Honorary Members of the Society:

Sir William Henry White, of London, England.
Robert Bennett Gorsuch, of Mexico.

The Secretary announced that the Thirty-seventh Annual Convention of the Society would be held at Cleveland, Ohio, on June 20th to 23d, 1905, and that the following Committees have been appointed to take charge of the arrangements:

COMMITTEE OF THE BOARD OF DIRECTION.

Alfred Craven, Chas. Warren Hunt,
Nelson P. Lewis, William J. Wilgus,
Chas. S. Gowen.

LOCAL COMMITTEE OF ARRANGEMENTS.

A. Mordecai, *Chairman;*

Wm. J. Carter, F. C. Osborn,
E. A. Handy, W. P. Rice,
A. W. Johnston, J. Ritchie,
M. W. Kingsley, S. T. Wellman,
J. Francis Le Baron, C. H. Wright.

The Secretary read a letter* from Chas. H. Snow, M. Am. Soc. C. E., inviting members of the Society to attend a lecture on the Goldschmidt Thermite process, at 4.30 P. M. on Thursday, January 19th, 1905.

The Secretary presented the report† of the tellers appointed to canvass the Ballot for Officers for the ensuing year.

The President announced the election of the following officers:

President, to serve one year:

C. C. SCHNEIDER, New York City.

Vice-Presidents, to serve two years:

M. L. HOLMAN, St. Louis, Mo.
EMIL KUICHLING, New York City.

Treasurer, to serve one year:

JOSEPH M. KNAP, New York City.

Directors, to serve three years:

District No. 1.—AUSTIN L. BOWMAN, New York City.
District No. 1.—MORRIS R. SHERRERD,
District No. 2.—HEZEKIAH BISSELL,
District No. 3.—WILLIAM B. LANDRETH,
District No. 3.—E. A. FISHER,
District No. 5.—GEORGE S. PIERSON,

Mr. Hague and Mr. C. S. Gowen conducted Mr. Schneider, the President-elect, to the chair.

Mr. Schneider addressed the meeting briefly.

Adjourned.

February 1st, 1905.—The meeting was called to order at 8.40 P. M., President C. C. Schneider in the chair; Chas. Warren Hunt, Secretary; and present, also, 92 members and 10 guests.

The minutes of the meeting of January 4th, 1905, were approved as printed in the *Proceedings* for January, 1905.

A paper entitled "Maximum Rates of Rainfall at Boston," by Charles W. Sherman, M. Am. Soc. C. E., was presented by the Secretary, who also presented a written communication on the subject from Kenneth Allen, M. Am. Soc. C. E.

The paper was discussed by Messrs. C. E. Gregory, W. M. Venable and E. Kuichling.

* See page 74.
† See page 76.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

William Carl Brohm, Louisville, Ky.
William Crozier, Washington, D. C.
Charles Stratton Davis, Toledo, Ohio.
Tokichi Endo, Osaka, Japan.
Louis Prevost Gaston, Somerville, N. J.
Luis Augusto Huergo, Buenos Aires, Argentine Republic.
Charles Humphreys, Wheeling, W. Va.
Curtis Edwin Knickerbocker, Middletown, N. Y.
Arthur Jones Rockwood, Rochester, N. Y.
Raphael Chart Smead, Washington, D. C.
Frank McClellan Sylvester, Norfolk, Va.
Edward Everett Wall, St. Louis, Mo.

As Associate Members.

William Stuart Babcock, New Haven, Conn.
Francis Wheelwright Belknap, New York City.
Rodman Merritt Brown, Chicago, Ill.
Russell Chase, North Fork, Cal.
Louis Gillespie Fenton, New York City.
Herluf Trolle Forchhammer, Newark, N. J.
Hermann Fougner, Johannesburg, South Africa.
Albert Henry Greenwood, Elizabeth, N. J.
Frank Dudley Holbrook, Wellsburg, W. Va.
Alexander Rieman Holliday, Indianapolis, Ind.
Harry Alfred Lane, Cumberland, Md.
Louis Ralph Lavalle, Johannesburg, South Africa.
Ora Miner Leland, Ithaca, N. Y.
William Joseph Lightfoot, Montrose, Colo.
Henry Bennett Machen, New York City.
Walter Wesley McLaughlin, Logan, Utah.
Chauncy Rusch Perry, Boston, Mass.
Nathan Herbert Sanderson, Boston, Mass.
Ulrich Taubenheim, Archangel, Russia.
Noble Earl Whitford, Albany, N. Y.

The Secretary announced:

The transfer of the following candidates, by the Board of Direction, on January 31st, 1905:

From Associate Member to Member.

Edwin Griggs Adams, Jr., Tientsin, China.
Samuel Jefferson Chapleau, Ottawa, Ont., Canada.
George Lewis Christy, New York City.
Hermann Meriwether Knapp, Cincinnati, Ohio.

George Washington Lilly, Columbus, Ohio.
Gerard Hendrik Matthes, Lawton, Okla.
Charles Sterling Millard, Indianapolis, Ind.
Joseph Bodine Wright, New York City.

From Associate to Member.

Wolfgang Gustav Triest, New York City.

From Associate to Associate Member.

Fred Lincoln Stearns, New York City.

The election of the following candidates by the Board of Direction:

As Juniors.

On January 3d, 1905,
Stuart Augustus Stephenson, Jr., Newark, N. J.
On January 31st, 1905,
Elmer Ellsworth Barnard, Lynchburg, Va.
Robert Edward Barrett, Framingham, Mass.
Walter Frederick Reichardt, Little Rock, Ark.

The Secretary announced the following deaths:

Macy Stanton Pope, elected Associate Member May 2d, 1900; died December 10th, 1904.

William Beswick Myers-Beswick, elected Member January 3d, 1894; died December 27th, 1904.

Henry Brigham Looker, elected Associate Member May 3d, 1893; died January 5th, 1905.

Cassius Howard Lindenberger, elected Associate February 2d, 1892; died January 5th, 1905.

George William Frank, elected Member February 1st, 1899; died January 19th, 1905.

Edward Sherman Gould, elected Member November 4th, 1885; died January 24th, 1905.

Adjourned.

February 15th, 1905.—The meeting was called to order at 8.45 P. M., Vice-President Kuichling in the chair; Chas. Warren Hunt, Secretary; and present, also, 108 members and 19 guests.

A paper, entitled "The Water-Works of Porterville, California," by Philip E. Harroun, M. Am. Soc. C. E., was presented by the Secretary, who also read a communication on the paper from D. C. Henny, M. Am. Soc. C. E.

The subject was discussed orally by Messrs. H. F. Dunham, G. W. Tillson, H. J. Howe, G. L. Christian and W. M. Venable.

The Secretary announced the death of Casimir Constable, elected Member June 17th, 1868; died February 6th, 1905.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

January 18th, 1905.—The Board met during the Annual Meeting, as required by the Constitution, C. C. Schneider in the chair; Chas. Warren Hunt, Secretary, and present, also, Messrs. Bissell, Bowman, Craven, Croes, Davison, Deyo, Ellis, Fisher, Gowen, Hermany, Knap, Kuichling, Landreth, N. P. Lewis, Modjeski, Noble, Osgood, Sherrerd, and Webster.

The following Standing Committees were appointed:

Finance Committee: S. L. F. Deyo, Chas. S. Gowen, M. L. Holman, Emil Kuichling, George S. Pierson.

Publication Committee: Joseph O. Osgood, Alfred Craven, M. R. Sherrerd, Geo. S. Davison, Hunter McDonald.

Library Committee: Nelson P. Lewis, E. C. Lewis, H. Bissell, Ralph Modjeski, Chas. Warren Hunt.

A Committee on Membership was also appointed.

Mr. Hunt then retired.

Chas. Warren Hunt was unanimously elected Secretary for the ensuing year. Mr. Hunt, having been advised of his election, returned.

Joseph T. Richards, M. Am. Soc. C. E., was appointed Chairman of the Special Committee on Rail Sections.

E. C. Carter, M. Am. Soc. C. E., was appointed a member of the Special Committee on Rail Sections.

Adjourned.

January 31st, 1905.—8.35 P. M.—President Schneider in the chair, Chas. Warren Hunt, Secretary, and present, also, Messrs. Bowman, Bissell, Deyo, Gowen, Knap, Kuichling, N. P. Lewis, Noble, and Osgood.

A committee was appointed to consider the resolution referred to the Board at the Annual Meeting.

Messrs. Harry Fuller and W. H. Searles were added to the Committee of Arrangements for the Annual Convention.

The following resolutions were unanimously adopted:

"*Resolved,* That the thanks of the American Society of Civil Engineers be extended to the Pennsylvania Railroad Company for its great courtesy in furnishing, for the use of the Society at its Annual Meeting, January 19th, 1905, facilities, including a special train, for the inspection of the work at the new freight terminal at Greenville, N. J., which enabled such a large party of its members to inspect this interesting development."

"*Resolved,* That the thanks of the American Society of Civil Engineers be extended to the Long Island Railroad Company for its great courtesy, in placing at the disposal of the Society the steamer *Sagamore* on the occasion of its Annual Meeting, January

19th, 1905, which enabled a large number of the members of the Society to spend a most enjoyable sail in a visit to the new freight terminal of the Pennsylvania Railroad at Greenville, N. J., and the new drawbridge of the Central Railroad of New Jersey."

Applications were considered and other routine business transacted.

Eight Associate Members and one Associate were transferred to the grade of Member, one Associate was transferred to the grade of Associate Member, and four candidates were elected Juniors.

Adjourned.

REPORT IN FULL OF THE FIFTY-SECOND ANNUAL MEETING, JANUARY 18th AND 19th, 1905.

Wednesday, January 18th, 1905.—The meeting was called to order at 10 A. M.; President Charles Hermany in the chair; Charles Warren Hunt, Secretary, and present, also, about 300 members. Meeting Called to Order.

THE PRESIDENT.—The meeting will please come to order. The minutes of the meeting of January 4th, 1905, in accordance with the custom, will be printed in the January number of *Proceedings,* and come up in due course for action at the meeting of February 1st, 1905. In view of this fact, the reading of the minutes will be dispensed with, unless some call is made for them.

The next in order is the appointment of tellers to canvass the Ballot for Officers. The Chair will appoint William H. Coverdale, L. White and B. M. Wagner. The ballot does not close until twelve o'clock, noon, but in order to enable a report to be made as soon as possible after that time, the canvass will proceed. Ballots will be received up to twelve o'clock, noon, and at that hour the ballot will be declared closed. Tellers appointed.

The next business in order is the annual report of the Board of Direction, to be presented by the Secretary. Report of the Board of Direction.

The Secretary read the report of the Board of Direction.*

On motion, duly seconded, the report of the Board of Direction was received and placed on file.

THE PRESIDENT.—The next business in order is the Annual Report of the Secretary.

The Secretary read his report.†

On motion, duly seconded, the report of the Secretary was received and placed on file.

THE PRESIDENT.—The annual report of the Treasurer, Mr. Knap.

The Treasurer read his report.‡

On motion, duly seconded, the report of the Treasurer was received and placed on file.

THE PRESIDENT.—The next business in order is the reports of Special Committees. First "On Uniform Tests of Cement." The Secretary has the report of this Committee. Report of Cement Committee.

The Secretary read the report of the Committee on "Uniform Tests of Cement," as follows:

JANUARY 18TH, 1905.

To the President and Members,

AMERICAN SOCIETY OF CIVIL ENGINEERS.

GENTLEMEN:

The investigations now in progress have not advanced sufficiently to reach definite conclusions, and your Committee on Uni-

* See *Proceedings*, Vol. XXXI, p. 10 (January, 1905).
† See *Proceedings*, Vol. XXXI, p. 20 (January, 1905).
‡ See *Proceedings*, Vol. XXXI, p. 22 (January, 1905).

Report of Cement Committee (continued).

form Methods of Tests of Cement is unable to present a final report at this time, and it asks therefore that it be continued.

GEO. S. WEBSTER,
Chairman;
RICHARD L. HUMPHREY,
Secretary.

Committee:
GEORGE F. SWAIN,
ALFRED NOBLE,
LOUIS C. SABIN,
CLIFFORD RICHARDSON,
SPENCER B. NEWBERRY,
W. B. W. HOWE,
F. H. LEWIS.

THE PRESIDENT.—Gentlemen, what will you do with the report?

It was moved and seconded that the report be received and placed on file, and that the request of the Committee, that it be continued, be approved.

The motion was carried.

Report of Committee on Rail Sections.

THE PRESIDENT.—The next report is from the Committee on the subject of "Rail Sections." The late L. F. G. Bouscaren was Chairman of this Committee.

JOSEPH T. RICHARDS, M. Am. Soc. C. E.—The report of the Special Committee on Rail Sections is as follows:

REPORT OF THE SPECIAL COMMITTEE ON RAIL SECTIONS.

Your Committee respectfully report that during the year they have given consideration to the work of committees on rail specifications which have been appointed by The American Railway and Maintenance-of-Way Association, The American Society for Testing Materials, and the Engineering Standards Committee (Great Britain), and with which Committees yours is working in harmony.

Your Committee has also obtained and discussed data pertaining to the service of rails made by different metallurgical processes, and under various specifications. In addition to this, they are keeping record of the use by American and other railways of rails of the American Society's sections.

In the judgment of your Committee all of this will enable them to make later a more definite report to the Society. However, in the meantime, they would report that correspondence with the Engineers of the Railways of the United States and Canada, evidences that while the wear of the heavier sectioned rails is not so satisfactory as that of the lighter ones, at the same time, there is not a demand on the part of said railways for a change in any of the American Society's sections. In addition to this, a conference with a committee representing American Steel Rail Manufacturers elicited from said Committee the statement that the manufacturers were entirely satisfied with the American Society's sections.

In view of the above, your Committee does not now recommend any change in the American Society's sections.

Inasmuch as the Committees of the several Societies above named hope soon to reach definite conclusions, and in view of the International Railway Congress to be held in Washington, D. C., in May next, your Committee think it well that their labors be continued, and therefore respectfully ask for such authority.

JOSEPH T. RICHARDS,
Acting Chairman.

JANUARY 18TH, 1905.

THE PRESIDENT.—Gentlemen, you have heard the report on "Rail Sections." What will you do with it?

It was moved, and duly seconded, that the report be received and placed on file, and that the Committee be continued.

The motion was carried.

Report of Committee on Concrete and Concrete Steel.

THE PRESIDENT.—The next business in order is the report of the Committee on Concrete and Concrete-Steel. Mr. C. C. Schneider is the Chairman of that Committee.

C. C. SCHNEIDER, M. Am. Soc. C. E.—The Secretary of the Committee, Mr. Schaub, has the report. At the same time I would announce that your Committee has requested him to read it.

J. W. SCHAUB, M. Am. Soc. C. E.—I would ask that Mr. Hunt read the report.

The Secretary read the report of the Committee.

JANUARY 17TH, 1905.

To the President and Board of Direction of the

AMERICAN SOCIETY OF CIVIL ENGINEERS:

Your Special Committee on Concrete and Steel-Concrete begs leave to report:

The first meeting of the Committee was held at Atlantic City, N. J., June 16th, 1904, at which there were present the members appointed.

The first business before your Committee was the recommendation of a proper descriptive name for a combination of Concrete and Steel. After careful consideration the name Reinforced Concrete was unanimously adopted as a proper term for this combination of Steel and Concrete.

Your Committee was instructed to co-operate with other societies desiring to assist in the investigations proposed. In pursuance with these instructions your Committee invited representation from the American Railway Engineering and Maintenance-of-Way Association, American Society for Testing Materials, and the Association of Portland Cement Manufacturers.

Subsequent to the first meeting of your Committee a second meeting was held, at which representatives of the Associations above named were present. As a result of this meeting, and a later meeting, held at St. Louis, at the time of your meeting in that city,

Report of Committee on Concrete and Concrete-Steel (continued).

in October, 1904, Sub-Committees were appointed on "Plan and Scope," "Ways and Means," and on "Tests."

These Committees started in with their work, and, as a result, a tentative outline of the work contemplated by this body was unanimously adopted, and which is appended to this report. When it is finally made a record of the work, an Historical Sketch of the art of concrete and reinforced concrete will be made a part of the final report of your Committee.

The Committee on Tests has put itself in communication with some twelve colleges, and has received co-operation from them in the making of tests, and in the work suggested by the Plan and Scope Committee. Materials have been provided of a uniform character and standard for the experiments to be made, and a careful inspection is to be had, so that when all of the tests are correlated the results will be of standard and uniform character.

The Committee on Ways and Means has undertaken to provide funds for the carrying out of the work, such as the cost of inspection and experiments necessary, by soliciting contributions from the various societies associated with your Committee, and from the railroads, manufacturers, philanthropists, and others interested in this work.

Your Committee met again, both as a Joint Committee, and as a Committee of your Society, at the Society House, on January 17th, 1905, and adopted rules and by-laws for the government of its members, and approved of the work so far done by the several Committees.

It is hoped that during the coming year a sufficient number of tests will be made in many of the branches as suggested by the Sub-Committee on Plan and Scope to give some rules for governing Concrete and Reinforced Concrete construction, although the general work outlined by the Plan and Scope Committee may cover more than a single year.

The report of your Committee is submitted, together with the report of the Sub-Committee on Plan and Scope.*

Respectfully,

C. C. Schneider, *Chairman;*
John E. Greiner,
W. K. Hatt,
Olaf Hoff,
R. W. Lesley,
Emil Swensson,
A. N. Talbot,
J. R. Worcester,
J. W. Schaub, *Secretary.*

It was moved and seconded that the reading of the report of the Sub-Committee be omitted, but that it be printed in the *Proceedings* of the Society.

The motion was carried.

The Secretary.—There is a further report of this Committee, addressed to the Board of Direction, as follows:

* See page 86.

NEW YORK, JANUARY 17TH, 1905.

Change in name of Committee on Concrete and Concrete Steel.

To the President and Board of Direction of the

AMERICAN SOCIETY OF CIVIL ENGINEERS:

It is the unanimous wish of the members of your Special Committee on Concrete and Steel-Concrete to have the name of this Committee changed to the Special Committee on Concrete and Reinforced Concrete.

The reason for this change is to adopt a name which is more descriptive of the purpose of your Committee.

C. C. SCHNEIDER,
Chairman;
J. W. SCHAUB,
Secretary.

It was moved and seconded that the request of the Committee, that the name be changed, be granted.

The motion was carried.

THE PRESIDENT.—Gentlemen, what will you do with the report of the Committee?

It was moved and seconded that the report be received and placed on file, and that the Committee be continued.

The motion was carried.

Nominating Committee

THE PRESIDENT.—The next business in order is the appointment of members of the Nominating Committee from each of the seven geographical districts to serve for two years.

THE SECRETARY.—Mr. President, in accordance with the instructions of the Board of Direction, the suggestions for the members of the Nominating Committee from sub-districts have been tabulated, and are as follows.

I would like to say, however, before reading this report that a very large number of the suggestions have been received since the close of business yesterday, and up to that time a very careful count had been made and verified. There have been many ballots withdrawn and others substituted, and the Secretary does not know whether all of those ballots are absolutely correct; that is to say, there may be a man who has voted twice and there has been no time to verify this. He is inclined, however, to believe it is not so, but has not made that check.

District No. 1.—Total number of votes received, 341; distributed as follows:

CHARLES L. HARRISON	217
WILLIAM A. CATTELL	101
ARTHUR S. TUTTLE	3
J. J. R. CROES*	2

Nominating Committee (continued).

The following have received one vote each:

A. P. Boller,	O. E. Hovey,
L. L. Buck,	George A. Just,
Albert Carr,*	Eugene Klapp,
St. John Clarke,	Charles H. Myers,
Amory Coffin,	F. S. Odell,
James H. Edwards,	James Owen,
A. I. Frye,	William Barclay Parsons,
George E. Gifford,	Robert Ridgway,
Charles H. Graham,	W. B. Travell.

On motion, duly seconded, Charles L. Harrison, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for the First District.

The Secretary.—The nominations for District No. 2 are as follows:

District No. 2.—Total number of votes received, 57; distributed as follows:

John R. Freeman	22
John R. Worcester	4
George H. Kimball	3
C. Frank Allen	2
Leonard Metcalf	2
Hiram A. Miller	2

The following have received one vote each:

Charles A. Allen,	William Jackson,*
Dexter Brackett,	W. H. Moore,
Fred. Brooks,*	Henry Manley,
R. A. Cairns,	Dwight Porter,
F. S. Curtis,*	Arthur T. Safford,
Desmond FitzGerald,	S. P. Senior,
A. W. French,	C. W. Sherman,
B. W. Guppy,	George F. Swain,
Richard A. Hale,	S. E. Tinkham,
Henry A. Herrick,	F. O. Whitney,
Albert B. Hill,	Henry B. Wood.

On motion, duly seconded, John R. Freeman, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for District No. 2.

The Secretary.—The nominations for District No. 3 are as follows:

* Ineligible.

District No. 3.—Total number of votes received, 52; distributed as follows:

Charles F. Stowell	14
Phelps Johnson	9
A. H. Sutermeister	3
Le Grand Brown	2
Palmer C. Ricketts	2

The following have received one vote each:

M. F. Bonzano,	E. H. Keating,
E. A. Bond,	O. H. Landreth,
E. E. Brydone-Jack,	William B. Landreth,
R. Cartwright,	Emile Low,
C. L. Crandall,	E. H. McHenry,
E. A. Fisher,	C. M. Morse,
William A. Haven,	E. G. Spilsbury,
William E. Hoyt,	William F. Tye,
Frank A. Hinds,	H. A. Van Alstyne,
John Kennedy,	E. H. Van Hoesen,*
S. M. Kielland,	J. Van der Hoek.

On motion, duly seconded, Charles F. Stowell, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for District No. 3.

The Secretary.—The following are the nominations for District No. 4:

District No. 4.—Total number of votes received, 98; distributed as follows:

James K. Lyons	57
Edgar Marburg	7
Alexander Mackenzie	4
John C. Trautwine*	4
W. G. Wilkins	3
John Sterling Deans	2
J. V. W. Reynders	2

The following received one vote each:

J. A. Atwood,	Morris Knowles,
A. Bonzano,	L. E. Johnson,
Mendes Cohen,	Robert W. Lesley,*
James Christie,	Mansfield Merriman,
Robert A. Cummings,	S. P. Mitchell,
George Davison,*	J. Madison Porter,
Emil Gerber,	P. M. Sax,
John W. Hill,	Francis Lee Stuart,
David J. Howell,	Emil Swensson,

Thomas W. Symons.

* Ineligible.

Nominating Committee (continued).

On motion, duly seconded, James K. Lyons, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for District No. 4.

The Secretary.—The following nominations are from District No. 5:

District No. 5.—Total number of votes received, 46; distributed as follows:

C. F. Loweth	5
Gardner S. Williams	4
M. J. Riggs	3
J. B. Davis	2
E. A. Handy	2
R. Modjeski*	2
G. A. Marr	2
F. C. Osborn	2
C. L. Strobel	2

The following have received one vote each:

John Alvord,	M. A. Howe,
W. L. Breckenridge,	R. W. Hunt,
M. J. Caples,	W. M. Hughes,
F. W. Cappelen,	George W. Kittredge,
E. C. Carter,	J. W. Schaub,
L. E. Chapin,	A. N. Talbot,
F. L. Condron,	Harry E. Talbott,
John H. Darling,	William D. Taylor,
William de la Barre,	H. U. Wallace,
O. H. Ernst,	George Y. Wisner,
F. E. House,	P. K. Yates.

On motion, duly seconded, Charles F. Loweth, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for District No. 5.

The Secretary.—The following is the ballot from District No. 6:

District No. 6.—Total number of votes received, 48; distributed as follows:

J. A. L. Waddell	5
Hunter McDonald*	3
C. S. Churchill	2
J. W. Kendrick	2
George E. Earl	2
A. Perrilliat	2

* Ineligible.

The following have received one vote each:

Ward Baldwin,	J. M. Johnson,
D. Bontecou,	J. L. Ludlow,
C. M. Bolton,	R. Montfort,
William Cain,	E. Montfort,†
J. F. Coleman,	George B. Nicholson,
E. J. Chibas,	J. A. Ockerson,
W. W. Coe,	J. A. Omberg, Jr.,
W. H. Courtney,	Hiram Phillips,
William P. Craighill,	C. D. Purdon,
Edward Flad,	Henry M. Pharr,
F. L. Goodale,	A. M. Scott,
C. H. Goodale,†	Miller A. Smith,
William McL. Hall,	Henry M. Steele,
J. V. Hanna,	J. L. Van Ornum,
William E. Hutchings,	C. C. Wentworth,
A. L. Johnson,	Nisbet Wingfield.

On motion, duly seconded, J. A. L. Waddell, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for the Sixth District.

The Secretary.—From District No. 7 the nominations are as follows:

District No. 7.—Total number of votes received, 46; distributed as follows:

J. D. Isaacs	4
Charles D. Marx*	4
Arthur L. Adams	2
J. B. Lippincott	2
Franklin Riffle*	2
Andrew Rosewater	2
H. A. Sumner	2
E. T. Wright	2

The following received one vote each:

R. B. Burns,	C. E. Moore,
A. F. Doremus,	William S. Post,
W. A. Drake,	J. H. Quinton,
F. W. D. Holbrook,	D. W. Ross,
W. P. Holman,	W. H. Saunders,
Louis Kingman,	H. N. Savage,
E. C. Kinney,	James D. Schuyler,*
M. L. Lynch,	A. F. Sears,
O. O. McReynolds,	W. B. Storey, Jr.,
F. O. Marvin,	R. H. Thompson,
S. D. Mason,	Otto von Geldern,
John Millis,	J. H. Wallace,
C. A. Morse,	B. S. Wathen.

* Ineligible.

Nominating Committee (continued).

On motion, duly seconded, J. D. Isaacs, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for the Seventh District.

THE PRESIDENT.—Before we hear the announcements from the Secretary, it is proper to inquire whether there is any member present who has any new business to offer at this meeting.

Resolution Relating to Appointment of Members on Commissions.

SAMUEL WHINERY, M. Am. Soc. C. E.—Mr. President, I wish to present a resolution, reading as follows:

(1) *Whereas*, It has been at times in the past, and may be in the future, suggested that members to serve on technical or other commissions, or to render special professional services, be nominated by the American Society of Civil Engineers, and

(2) *Whereas*, No provision now exists in the Constitution or rules of the Society authorizing and governing the making of such nominations.

(3) *Whereas*, It is proper and desirable that the attitude of the Society in reference to making such nominations shall be determined and expressed; therefore,

Resolved, That the Board of Direction be requested to consider the propriety and advisability of the Society making such recommendations or nominations from among its own members, or others, for special positions or services; to take measures, if they shall deem it advisable, to ascertain the views of the membership on the subject; and to submit to the next Annual Convention its conclusions and recommendations in the matter.

Mr. President, I move the adoption of that resolution.

The motion was seconded.

Discussion on Appointment of Members on Commissions.

THE PRESIDENT.—Gentlemen, this resolution involves a radical departure from the established usages of this Society. It is, therefore, not only in order now, but of great importance, to discuss the question. The discussion is in order.

Mr. WHINERY.—It was not my intention, in presenting this resolution at this time, nor do I think it desirable, perhaps, in view of certain circumstances, that a general discussion of the main question be taken up at this time. It is, however, as the President says, a matter of very great importance. It is one about which the policy of the Society should be decided, and I know of no better or more satisfactory way of procedure than that outlined in the resolution, which is to refer the whole matter to the Board of Direction, to be considered and reported upon at the next Annual Convention of the Society. That will give time, not only for careful examination, and the whole question certainly deserves the most careful examination of the Board of Direction, but the very careful consideration of members of the Society. When the report of the Board of Direction is presented, it should then be, and I hope will be, very thoroughly discussed. There is, as the resolution states,

no provision whatever in the present Constitution or Rules of the Society governing this matter. Such appointments have been suggested in the past and, as stated in the preamble, may be suggested or requested in the future. When such requests are made to us, it is usually urgent that action be taken promptly, and for that reason I think that the policy of the Society in relation to that whole question should be thoroughly threshed out and a decision reached, and, whatever that decision may be, carried into effect.

(Calls of "question.")

The President.—Any further remarks?

J. J. R. Croes, Past-President, Am. Soc. C. E.—The policy of the Society, with reference to the appointment of experts, has been established, and has been very thoroughly established. There is no question about it. This raises the question whether or not the policy of the Society is to be reversed; whether a change is desirable. By referring this matter to the Board of Direction, you will bring up the question afresh. The policy of the Society is as fixed as possible, that it is not desirable, and never has been considered desirable or proper, that the American Society of Civil Engineers should interfere in the appointment or selection of persons for positions of trust. The resolution appears to be harmless on its face, but it is a question leading up to a radical change, and I, for one, will vote against the resolution being referred to the Board of Direction, of which I happen to be a member, and I don't think it is necessary or desirable that that question should be raised at this time at all.

(Applause.)

C. A. Hague, M. Am. Soc. C. E.—This question looks like the parting of the ways. It may lead to a better road; it may lead to a worse one. But it will probably be very valuable to look into the matter and see as far as may be where the road may lead to.

Foster Crowell, M. Am. Soc. C. E.—I do not consider that the discussion of this subject is going necessarily to lead in one direction or the other, but, nevertheless, the difficulty which now exists is that the outside world supposes that the recommendation of this Society can be asked for and obtained in such matters. Whether or not it will be desirable to do that is the important question, as affecting the interests of the Society, which is the thing first of all to be considered. I think it is highly important that this investigation by the Board of Direction, and proper presentation of the subject before the Society, should be made, and I am heartily in favor of adopting the resolution, although I do not now feel either in favor or positively against it.

George Hill, M. Am. Soc. C. E.—It seems to me that in a

Discussion on Appointment of Members on Commissions (continued).

Society of so large a membership as this the entire membership should be given an opportunity to express an opinion on a question of such gravity as that resolution provides for. A vote against the resolution would deprive the large majority of our membership of the opportunity of expressing their opinion. The Society, in times past, has decided against any such action, but year by year the membership of the Society has increased enormously. It is possible, therefore, that year by year the feeling of the Society, as a whole, changes, and we certainly should bring up this question, a question of so much moment every few years, to ascertain surely what the opinion of the entire Society is, and not cut off any such opportunity at a meeting representing only a small fraction of the whole membership.

H. W. Brinckerhoff, M. Am. Soc. C. E.—I understood that the resolution provides for ascertaining by the Board of Direction the views of the Society. I would like to ask if the Society has been formally asked at any time past to make such recommendation? I know that it has been suggested, but I do not know if such a question has ever been asked. I would like to know what response has been made to such a request, if anything.

The Secretary.—I do not think I can go back far enough to answer that question.

A. P. Boller, M. Am. Soc. C. E.—I think I can answer that question, Mr. President. In 1885, or along there, the Society was asked to name a Commission to study the question of the terminal situation in the City of Providence, which, at that time, had been the cause of a great deal of contention between the citizens and the railroads, and on that Commission a selection was made from the Society, consisting of Mr. Don J. Whittemore, of Milwaukee; Mr. Joseph M. Wilson, of Philadelphia, and myself. Just how that was brought about, I do not know. Whether it was simply the action of the President, or whether it was the action of the Board of Direction, I do not know. But that Committee was appointed and acted as a Committee selected by the American Society of Civil Engineers at that time.

F. P. Stearns, M. Am. Soc. C. E.—I am inclined to favor this resolution, and will go just a word further to say that it seems to me undesirable, under the general circumstances, that this Society should appoint members or nominate men for different positions. But it seems to me, also, that it may make a great difference whether that request comes from some minor body, or people to whom the Society is not under obligations, or whether it comes in the form of some action by the Government—by the Government of the State of New York, for instance—and that there might be conditions under which it would be desirable that such nominations should be made.

That being the case, it is very desirable to have the opinion of the Society as to whether nominations should be made under any circumstances; but, in the mean time, such conditions may arise, and I do not know but what it might be that the Board of Direction could not act until it had referred the matter to the Society. It seems to me that the Board of Direction ought to be free to act if it sees fit to do so, notwithstanding this resolution; that is, it should not prevent the Board from acting if otherwise it would think best to act under its present powers.

Mr. WHINERY.—I think there is nothing whatever in the resolution that places any restraint upon the Board of Direction in any action it may take in the meantime, until the decision on this point is reached. The Board of Direction will remain as perfectly free to act in any cases that may come up in the immediate future as it is now.

(Several voices, "question.")

THE SECRETARY.—Pardon my calling attention to the fact that this resolution recites as follows:

"*Whereas,* No provision now exists in the Constitution or rules of the Society authorizing and governing the making of such nominations."

Might that be construed to prevent the Board from acting?

Mr. WHINERY.—Mr. President, I think not. The fact, I think, is as stated in the resolution. Whatever action may have been taken by the Society heretofore or by its Board of Direction, there is, as far as I understand it, no provision whatever in the Constitution of the Society, no rule has been established by the Society, governing these cases, so that the resolution, in that respect, simply states the fact.

But I might add a few words to this effect: I think it is due, not only to the Society, but to the public at large, that the American Society of Civil Engineers should have a policy on this important question, and should be prepared to announce it promptly to the public. It is due to the public—particularly in view of the growing importance and influence of the American Society of Civil Engineers—it is due to the public that they should know the policy of the Society in that matter, so that no mistake may be made, so that, in ignorance of our policy, no public official shall recommend the passing of any law or Act of Congress which involves that question—which involves the composition of any Commission or the employment of any experts on the recommendation of the American Society of Civil Engineers. I have expressed no opinion upon the main question, at all, nor does the resolution express any opinion upon it, nor does it bind the Society to any action, whatever, in the meantime. It is merely a proposition to take up this subject and

Discussion on Appointment of Members on Commissions (continued).

consider it, and, when so considered, to adopt the line of policy which will govern future conduct of the American Society of Civil Engineers, and the procedure of the Society in cases of this kind when they come up. It is evident here, and to most of the members of the Society, that there is wide difference of opinion upon the desirability of the Society undertaking any action of that kind. There being a decided difference of opinion on the subject, it is certainly proper, and it is certainly proper here and now, to take the matter up and consider it and arrive at a conclusion which will govern the future action of the Society. I do not wish to say anything in favor of either side of the question; I simply ask that the whole matter be taken up, considered and decided. (Applause.)

JOHN BOGART, M. Am. Soc. C. E.—While it is true, I believe, that there is nothing in the Constitution of the Society touching upon this question, yet it is also true, as Mr. Croes has stated, that for many years there was adopted a decided policy by the Board of Direction upon this question.

I think that the appointment which Mr. Boller has referred to led to the adoption of that rule. Previous to that time, I do not think the matter had positively been settled, and that the appointment of that commission, or suggestion of that commission, was made at the time because the request for it was made, and then the members of the Society did not feel that there would be any objection to suggesting the names suggested. But the Board of Direction certainly did adopt a policy and I think the matter was discussed at a convention or annual meeting, a good many years ago, and a policy then adopted, I think, and that was: that it was not the function of the governing body of this Society to discriminate between its members for appointment to any position. Now, that has been the policy of the Society during the time when I was intimately connected with its management. I think the same policy has been followed ever since. Am I right on that?

THE SECRETARY.—So far as I know.

MR. BOGART.—I don't know that there is any objection to the matter being taken up again, and considered by the Board of Direction, and by the Society as a whole, but I do feel that there certainly is at the present moment that decided stand that the Board of Direction has not felt itself authorized—at the request of any board or body—to suggest to that board the name or names of members when there may be many other members who may be just as well fitted for a particular duty. It is only fair to the large number of members present who may discuss the question that I should explain it.

EDWARD P. NORTH, M. Am. Soc. C. E.—Possibly I can refresh the last speaker's memory. I believe there were three appointments

of experts or commissions, one referred to by Mr. Boller, the Rapid Transit Commission, and an expert on Philadelphia pavements. The appointment last mentioned made some little bad feeling, and, in consequence of that resolution of the Board—as I understand it, the year Mr. Bogart referred to was eighteen or twenty years ago—the Constitution of the Society was thoroughly revised. And I believe if you will look through that Constitution you will look through it without finding any power at all given to the Board of Direction to appoint any commissions or recommend any professional man. It was left so, as I understood it, rather than to have an interdiction of the thing with the understanding that, lacking power to do a thing the Board of Direction would not do it. I had a good deal of sympathy with that action of the Society at that time, and I have with it still, but in the course of eighteen years it might be advisable to have a change, and I think that Mr. Whinery's motion should prevail and we should have the understanding of the whole Society on this subject, which is a very important one. (Applause.)

Gardner S. Williams, M. Am. Soc. C. E.—One point I would call attention to: the word "authorize." It seems to me that it would perhaps be better to drop out the word "authorize" or the words "authorize and," and make use of the word "govern." As long as the word "authorize" stands there, the interpretation of the resolution would be that at present the Board is not empowered and decidedly is forbidden to deal with such propositions. If we take out that word "authorized" and substitute the word "govern" it leaves the Board to deal with the question. I am perfectly willing to trust the honor of the Society to our Board. I don't wish to prolong this by making this motion, but I ask that the author make the change.

Mr. Croes.—I think the word "authorize" ought to stand as it is in the resolution. (Applause.)

(Numerous voices, "question.")

The President.—Are you ready for the question?

(Several members, "question.")

The President.—You have heard the resolution offered by Mr. Whinery. It has been seconded and elaborately discussed. How will you have the vote taken, *viva voce* or by ballot?

(Many voices, "*viva voce*.")

The President.—Let those in favor of that resolution manifest it by saying "aye."

(Many "ayes.")

The President.—Contrary minded, if any, no.

(A few voices say "no.")

The President.—The motion is carried and the resolution adopted.

Award of Prizes.

Is there any further new business to be offered at this meeting? If not, the Secretary will make some announcements.

THE SECRETARY.—Mr. President, as to the report of the Committee appointed to recommend the award of prizes. It is dated November 30th, and addressed to the Secretary.

Nov. 30, 1904.

MR. CHAS. WARREN HUNT, SEC.,
AM. SOC. C. E.,
220 W. 57TH ST., NEW YORK.

DEAR SIR:

The undersigned Committee, appointed for this purpose, have the honor to recommend the award of prizes for the year ending with the *Transactions* for the month of July, 1904, as follows:

The Norman Medal to Mr. Emile Low for his paper No. 971 on The Breakwater at Buffalo, N. Y.

The Thomas Fitch Rowland Prize to Mr. George Cecil Kenyon for his paper No. 970 on Dock Improvements at Liverpool.

The Collingwood Prize for Juniors to Mr. Herbert J. Wild for his paper No. 976 on The Substructure of Marsh River Bridge.

Respectfully submitted,

CHARLES L. STROBEL,
SAMUEL TOBIAS WAGNER,
J. L. LUDLOW,
Members Committee.

I have to report, Mr. President, that at the meeting of the Board of Direction on January 3d, 1905, the recommendations of the Committee as stated were adopted and prizes awarded in accordance therewith. (Applause.)

Announcement of Election of Honorary Members.

I also have great pleasure in announcing the election, by the unanimous vote of the Board of Direction and all living Past-Presidents, of the following gentlemen as Honorary Members of the Society:

SIR WILLIAM HENRY WHITE, of London, England;

ROBERT BENNETT GORSUCH, of Mexico.

Mr. Gorsuch is the only living man who was present at the first meeting when this Society was organized in November, 1852. He was the first Secretary and Treasurer.

Invitation to Lecture on the Thermite Process.

I also have a letter which I have been asked to read. It is from Charles H. Snow, M. Am. Soc. C. E., of the New York University, and is addressed to the Secretary.

NEW YORK CITY, January 16, 1905.

MR. CHARLES WARREN HUNT, SECRETARY,
AMERICAN SOCIETY OF CIVIL ENGINEERS,
West 57 Street, City.

DEAR SIR:—

Mr. A. Stürz of the Goldschmidt Thermite Co. will describe the Goldschmidt Thermite process in the College Auditorium, Thursday,

January 19, at four-thirty P. M. The lecture which will be given under the auspices of the Havemeyer Chemical Laboratory will be illustrated by the following experiments:

Reduction of Rare Metals.
The Heating Power of Thermite.
The Welding of a Rail.
The Repair of a Ruined Plate.
The Welding of a Pipe, etc.

New York University School of Applied Science extends a hearty invitation to any members who may care to attend this lecture. A train leaves Grand Central Station at 4:08. Tickets should be purchased to Morris Heights. The auditorium is located in sight on the hill to the north and is about ten minutes' walk from Morris Heights station.

Yours very truly,
CHAS H. SNOW.

Nov. 30, 1904.

Mr. Snow is a member of this Society, and Dean of the Engineering Faculty of New York University.

Announcements.

I think every member has a programme of the remainder of this meeting, and it will perhaps be unnecessary to read it. So far as the Secretary now knows, the programme will be carried out exactly as printed.

The President asks me to announce that a meeting of the Board of Direction of the Society will be held, directly after the adjournment of this meeting, in the office of the Secretary.

The tellers are very nearly finished with their count of the ballots, and, under the Constitution, the balloting for members cannot close until twelve o'clock. It is about a minute and a half to twelve now.

I am also requested, on behalf of the Chairman of the Committee of Arrangements for this meeting, to say that the Committee, after a great deal of careful thought, believes it can serve the lunch that is to be eaten at the Society House, at one o'clock or thereabouts, to-day, very well indeed if all members will be seated and keep as far away as possible from the table at which the caterer is to serve it. (Loud applause and much laughter.)

This is by special request of Mr. John W. Ellis.

THE PRESIDENT.—The hour of twelve o'clock having now arrived, it is in order for the Tellers on the Ballot for Officers to make their report. I should state that the hour of twelve having arrived, the ballot is closed and the report of the Tellers is now in order.

THE SECRETARY.—It is not quite ready, but I will go and see if I can hurry it a little.

THE PRESIDENT.—The Tellers are not quite ready to make their

Report of Tellers.

report, and therefore a recess will now be taken for five minutes, or such length of time as it requires to make its report.

(Recess.)

THE PRESIDENT.—(After recess.) The Secretary will now read the report of Tellers.

THE SECRETARY.—The Tellers report:

Report of Tellers Appointed to Canvass the Ballot for the Election of Officers at the Annual Meeting, January 18th, 1905.

Total number of ballots received	819
Defective	40
Total counted	779
For President:	
C. C. Schneider	763
E. L. Corthell	3
P. C. Ricketts	3
C. S. Gowen	1
G. B. Nicholson	1
O. F. Nichols	1
Mansfield Merriman	1
For Vice-Presidents:	
M. L. Holman	764
Emil Kuichling	759
W. J. Wilgus	2
R. Montfort	1
N. P. Lewis	1
P. C. Asserson	1
H. W. Hodge	1
A. Mackenzie	1
Emil Swensson	1
G. W. Rafter	1
James Dun	1
G. W. Catt	1
John Bogart	1
P. Alex. Peterson	1
S. G. Artingstall	1
For Treasurer:	
Joseph M. Knap	770
John Thomson	1
For Directors:	
A. L. Bowman	761
Morris R. Sherrerd	765
V. G. Bogue	1
R. C. Holliday	1
L. L. Tribus	1

George Gibbs	1
John Bogart	1
A. Lucius	1
C. L. Harrison	2
G. B. Francis	1
H. de B. Parsons	1
C. Davis	2
Hezekiah Bissell	769
E. P. Dawley	1
R. A. Cairns	1
William B. Landreth	767
E. A. Fisher	769
W. B. Cogswell	2
G. E. Ellis	1
C. S. Crandall	1
W. A. Haven	1
W. A. Brackenridge	1
George S. Pierson	768
H. G. Kelly	1
G. S. Williams	1
W. C. Jewell	1

W. H. Coverdale.
L. White.
B. M. Wagner.
Tellers.

Officers Elected.

The President.—According to the report of the Tellers, the following officers have been elected for the ensuing year:

As President, C. C. Schneider;

As Vice-Presidents, M. L. Holman and Emil Kuichling;

As Treasurer, Joseph M. Knap;

As Directors, A. L. Bowman, Morris R. Sherrerd, Hezekiah Bissell, William B. Landreth, E. A. Fisher and George S. Pierson.

President Schneider Introduced.

The President.—The Chair will appoint Mr. Hague and Mr. Gowen as a Committee to conduct Mr. C. C. Schneider, the President, to the platform. (Loud and continued applause.)

The President.—It gives me pleasure to introduce to you Mr. C. C. Schneider as President-elect of the American Society of Civil Engineers. (Great applause.)

Remarks by President Schneider.

President Schneider.—Members of the American Society of Civil Engineers, I take this opportunity to express my appreciation of the honor which you have conferred upon me by electing me to the highest and most honorable office within the reach of an engineer; an office which has been held by so many distinguished members of our profession that I feel somewhat timid lest I may not be as competent to fill this Chair as many of my illustrious

Remarks by President Schneider (continued).

predecessors. However, I will endeavor to perform my duties faithfully and conscientiously, remembering the welfare of the Society and the objects for which it is formed, namely, the advancement of engineering knowledge and practice, and the maintenance of a high professional standard among its members. I am confident I shall have your hearty support and co-operation in maintaining the high professional standard of this Society, which has been its great success, and not merely to maintain, but rather to improve the standard so that it may not be excelled by that of any other similar organization in the whole world. (Loud and continued applause.)

The Board of Direction meets immediately after the adjournment of this meeting. There being no other business before this meeting, a motion to adjourn is in order.

The meeting then adjourned.

EXCURSIONS AND ENTERTAINMENTS AT THE FIFTY-SECOND ANNUAL MEETING.

Wednesday, January 18th, 1905.—After the business meeting, lunch for about 450 members was served at 1.30 P. M. at the Society House. The afternoon was left free for individual recreation.

At 9 P. M. there was a Reception, with dancing, in the Society House, at which the attendance was about 300.

Thursday, January 19th, 1905.—The day was devoted to an excursion to the new Freight Terminal of the Pennsylvania Railroad at Greenville, N. J., by invitation of Samuel Rea, Fourth Vice-President, and William H. Brown, Chief Engineer.

The party met at the pier at the foot of East Thirty-fifth Street (East River) at 10 A. M. and embarked on the steamer *Sagamore,* kindly furnished through the courtesy of the Long Island Railroad Company. The sail down the East River and through New York Bay afforded an interesting panorama of engineering works. A landing was made at the Freight Terminal, and the piers and transfer bridges at Greenville were examined. Subsequently, the boat proceeded to Newark Bay, where the new lift-bridge of the Central Railroad of New Jersey was inspected. Lunch was served on the boat, and the party landed at the foot of Wall Street at about 3 P. M.

In the evening, at the Society House, W. H. Jaques, M. Am. Soc. C. E., gave an illustrated lecture on "The Development of Solar Evaporators." This was followed by a social and informal "Smoker," at which there was an attendance of about 450 members and guests.

The following list contains the names of 422 members, of various grades, who registered as being in attendance at the Annual Meeting. The list is incomplete, on account of the failure of many members to register, and it does not contain the names of any of the guests, of the Society or of individual members:

Abbot, F. W..Philadelphia, Pa.
Allen, C. M..Worcester, Mass.
Allen, Henry C.Syracuse, N. Y.
Allen, W. A....New York City
Allen, W. H....Brooklyn, N. Y.
Andrews, H.....Albany, N. Y.
Asserson, H. R..Brooklyn, N. Y.
Averill, F. L.Washington, D. C.
Bacon, John W..Danbury, Conn.
Bailey, Geo. I..New York City
Baker, H. C., Jr.New York City
Baldwin, F. H..Bayonne, N. J.
Baldwin, W. H..Yonkers, N. Y.
Bamford, W. B.New York City
Bance, C. W....Paterson, N. J.
Barney, P. C..Brooklyn, N. Y.
Bartram, G. C...Boston, Mass.
Basinger, J. G..New York City

Bates, O. . . . . Chicago, Ill.
Baum, G. . . . . New York City
Beach, R. J. . . . New York City
Beerbower, G. M. New York City
Belzner, T. . . . . New York City
Bensel, J. A. . . . New York City
Berg, W. G. . . . New York City
Bettes, C. R.,
Far Rockaway, N. Y.
Beugler, E. J. . . . Boston, Mass.
Bishop, G. H. Middletown, Conn.
Bissell, H. . . . . Boston, Mass.
Blakeslee, C. New Haven, Conn.
Boecklin, W. . . New York City
Bogart, J. . . . . New York City
Boller, A. P. . . . New York City
Bonzano, A. . . Philadelphia, Pa.
Bonzano, M. F. Philadelphia, Pa.
Bowman, A. L. . New York City
Brace, J. H. . . . New York City
Bramwell, G. W. New York City
Breithaupt, W. H.,
Berlin, Canada
Brendlinger, P. F.,
Philadelphia, Pa.
Breuchaud, J. . . Yonkers, N. Y.
Briggs, J. A. . . . New York City
Brinckerhoff, H. W.,
New York City
Brown, T. E. . . New York City
Brown, W. P. . . New York City
Brownell, E. H.,
Portsmouth, N. H.
Brownlee, J. L. New York City
Brunner, John. . . . Chicago, Ill.
Bryson, Andrew,
New Castle, Del.
Buchholz, C. W. New York City
Buck, L. L.,
Hastings-on-Hudson, N. Y.
Buck, R. S. . . . . New York City
Butts, E. P. . Springfield, Mass.

Carter, S. . . . . Norfolk, Va.
Catt, G. W. . . . . New York City
Cattell, W. A. . . New York City
Chambers, H. J. New York City
Chambers, R. H. New York City
Chase, R. D. . . . New York City
Chester, J. N. . . . Pittsburg, Pa.
Christian, G. L. New York City
Christy, G. L. . . New York City
Clapp, Otis F. Providence, R. I.
Clark, G. H. . Birmingham, Ala.
Clark, L. V. . Philadelphia, Pa.
Clarke, G. C. . . . New York City
Clarke, St. John. . Bogota, N. J.
Clement, John B. New York City
Codwise, E. B. . Kingston, N. Y.
Coffin, Amory. . New York City
Coffin, F. C. . . . . Boston, Mass.
Coffin, T. Amory. New York City
Cogswell, W. B. Syracuse, N. Y.
Collingwood, F. New York City
Coombs, S. E. . New York City
Cooper, Samuel L.,
Yonkers, N. Y.
Coverdale, W. H. New York City
Crandall, C. L. . . Ithaca, N. Y.
Crane, C. A. . . . New York City
Creuzbaur, R. W. New York City
Croes, J. J. R. . New York City
Crowell, Foster. New York City
Curtis, Varnum P.,
Worcester, Mass.

Dakin, A. H., Jr. New York City
Dana, R. T. . . . New York City
Davies, J. V. . . . New York City
Davis, Chandler. . New York City
Davis, Charles. . . Allegheny, Pa.
Davis, J. P. . . . New York City
Davis, R. B. . . . . Boston, Mass.
Davis, W. R. . . . Albany, N. Y.
Davison, G. S. . . . Pittsburg, Pa.
Dawley, E. P. . . . Boston, Mass.
Dean, Luther. . . Taunton, Mass.
Deyo, S. L. F. . New York City
Dorrance, W. T. New York City
Drew, C. D. . . . Brooklyn, N. Y.

Dunham, H. F..New York City
Dunham, L. A.Kansas City, Mo.

Edwards, D. G..New York City
Edwards, J. H....Oxford, N. Y.
Ellis, J. W..Woonsocket, R. I.
Erlandsen, O...New York City
Evans, L. H....New York City
Evans, M. E....New York City

Fairchild, J. F..Pelham, N. Y.
Farley, G. P....Wiscasset, Me.
Fernstrom, H..New York City
Fisher, E. A..Rochester, N. Y.
Fisher, Francis D.,
New York City
Flinn, A. D....New York City
Ford, P. D.....New York City
Ford, W. G.....Brooklyn, N. Y.
Ford, W. H..Philadelphia, Pa.
Forgie, James..New York City
Foster, T. J....New York City
Fox, H. H....Brooklyn, N. Y.
Foye, A. E.....New York City
Francis, G. B..New York City
Francis, H. N.Arlington, R. I.
Fraser, C. E....New York City
Frazee, J. H....New York City
French, A. H....Boston, Mass.
French, A. W.....Piqua, Ohio
Frost, G. S.....New York City
Frye, Albert I..Elizabeth, N. J.
Fuertes, James H.,
New York City
Fuller, Andrew D.Boston, Mass.
Fuller, W. B...New York City
Furber, W. C.Philadelphia, Pa.

Gartensteig, C..New York City
Gifford, G. E...New York City
Gildersleeve, A. C.,
New York City
Giles, Robert...New York City
Gillespie, R. H.New York City
Gilman, C.....New York City
Goad, C. E....Toronto, Canada
Goddard, H. W..New York City
Goodell, J. M..New York City
Goodrich, E. P..New York City
Gould, W. T....New York City
Gowen, C. S....Ossining, N. Y.
Graham, C. H..New York City
Graham, J. M..New York City
Granbery, J. H.Elizabeth, N. J.
Graves, E. D..Hartford, Conn.
Gray, J. H.....New York City
Greene, Carleton.New York City
Greenlaw, R. W.New York City
Greiner, J. E...Baltimore, Md.
Grimes, E. L.....Troy, N. Y.
Grimm, C. R...Brooklyn, N. Y.
Gudmundson, G..Pittsburg, Pa.

Hague, C. A...New York City
Haight, S. S...New York City
Haines, C. W...Richmond, Va.
Hale, H. M....New York City
Hall, L. W....Syracuse, N. Y.
Hall, Martin W.New York City
Hanavan, W. L.New York City
Harper, A. C....Panama, C. M.
Harris, Charles M.,
New York City
Harrison, C. L..New York City
Harrison, E. W.,
Jersey City, N. J.
Harte, C. R..New Haven, Conn.
Harwood, G. A..New York City
Haskins, W. J..New York City
Hauck, W.....New York City
Hazen, Allen...New York City
Hemming, D. W.New York City
Henderson, J. T.,
Hartford, Conn.
Herbert, H. M.,
Bound Brook, N. J.
Hering, Rudolph.New York City
Hermany, Charles,
Louisville, Ky.
Hewes, Virgil H.New York City
Hillyer, W. R.,
West Brighton, N. Y.

Hitchcock, F. C....Patton, Pa.
Hodgdon, Frank W.,
Boston, Mass.
Hodge, Henry W.,
New York City
Hogan, J. P...New York City
Hollyday, R. C.Brooklyn, N. Y.
Honness, G. G..Pawling, N. Y.
Horton, Sandford,
New York City
Hough, D. L...New York City
Hovey, O. E...New York City
Howell, D. J.Washington, D. C.
Hubbell, C. W..Detroit, Mich.
Hulse, S. C.....Ithaca, N. Y.
Humphreys, A. C.,
New York City
Hunt, Chas. W..New York City
Hunting, E. N...Pittsburg, Pa.
Hyde, C. G....Harrisburg, Pa.

Ives, A. S....Philadelphia, Pa.

Jacobs, C. M...New York City
Jacobs, R. H...New York City
Jaques, W. H.,
Little Boar's Head, N. H.
Johnson, A. L..St. Louis, Mo.
Johnson, L. J.Cambridge, Mass.
Johnstone, W. B.New York City
Just, G. A.....New York City

Kastl, A. E.....Denver, Colo.
Kaufman, G....Brooklyn, N. Y.
Keith, H. C....Brooklyn, N. Y.
Keller, O. B...New York City
Kelley, W. D....Yonkers, N. Y.
Khuen, R.....Ambridge, Pa.
Kimball, G. A...Boston, Mass.
King, Paul S...New York City
King, Wallace, Jr.,
New York City
Knap, E. D...Brooklyn, N. Y.
Knap, J. M.....New York City
Kolb, H. J....Brooklyn, N. Y.
Kummer, F. A..New York City

Landreth, O. H.,
Schenectady, N. Y.
Landreth, W. B..Albany, N. Y.
Lavis, F.....New York City
Leather, B. H..New York City
Lee, D. R...Middletown, N. Y.
Leffingwell, F. D.,
Montclair, N. J.
Leisen, T. A..Wilmington, Del.
Leonard, H. R.Philadelphia, Pa.
Lewis, F. H.....Staunton, Va.
Lindenthal, G..New York City
Lofland, H. F.Philadelphia, Pa.
Long, E. McL..New York City
Look, M. J.....Clinton, Mass.
Loomis, Horace,
Mt. Vernon, N. Y.
Loweth, C. F.....Chicago, Ill.
Lowinson, Oscar.New York City

MacCracken, G. G.,
New York City
Macdonald, H. P.,
Jersey City, N. J.
Machen, H. B..New York City
Macnab, G. T..New York City
McComb, C. O..Syracuse, N. Y.
McCulloch, R. A.New York City
McKay, J. E....New York City
McKenzie, T. H.,
Hartford, Conn.
McMinn, T. J..New York City
Madden, J. H..New York City
Manley, H.....Boston, Mass.
Mann, J. L....Hanover, N. H.
Marburg, Edgar,
Philadelphia, Pa.
Marden, Henry H.,
New York City
Marple, W. M....Scranton, Pa.
Matcham, C. A..Allentown, Pa.
Mead, C. A.,
Upper Montclair, N. J.
Merriman, M.,
South Bethlehem, Pa.

Merriman, T...Paterson, N. J.
Merritt, D. S..Tarrytown, N. Y.
Miller, F.....New York City
Miller, H. A.....Boston, Mass.
Miller, H. C....New York City
Miller, R. P....New York City
Mills, C. M...Philadelphia, Pa.
Mitchell, S. P...Pittsburg, Pa.
Mixer, C. A.Rumford Falls, Me.
Modjeski, Ralph...Chicago, Ill.
Montfort, R.....Louisville, Ky.
Moore, C. H...Montclair, N. J.
Moore, W. H.New Haven, Conn.
Moran, D. E....New York City
Morrill, G. S....Boston, Mass.
Morrison, H. J..Clinton, Mass.
Moses, P. R....New York City
Moulton, Mace..New York City
Myers, C. H....New York City

Nelson, A. H....Pittsburg, Pa.
Nichols, C. H.,
New Haven, Conn.
Nichols, O. F..Brooklyn, N. Y.
Noble, Alfred...New York City
Noble, F. C...Brooklyn, N. Y.
North, Edward P.,
New York City

Ockerson, J. A..St. Louis, Mo.
Odell, F. S..Port Chester, N. Y.
Opdyke, S. B., Jr.,
New York City
Osgood, J. O.....Jersey City
Ostrup, John C.New York City
Otagawa, M....New York City
Owen, James....Newark, N. J.
Oxholm, T. S.,
West New Brighton, N. Y.

Parker, A. M...New York City
Parker, C. J...New York City
Parmley, W. C..New York City
Parsons, G. W....Steelton, Pa.
Patch, W. W...New York City
Pegram, G. H..New York City
Pemoff, J. J....New York City
Peverley, R....New York City
Pistor, G. E. J..Newark, N. J.
Polk, W. A....New York City
Pollock, C. D..Brooklyn, N. Y.
Potter, Alexander,
New York City
Pratt, W. A....New York City
Price, P. W.....Pittsburg, Pa.
Pruyn, P. W....Pittsburg, Pa.

Quinby, Edwin R.,
New York City
Quincy, C. F.....Chicago, Ill.

Read, R. L.....Malden, Mass.
Reichmann, A. F..Chicago, Ill.
Reynders, J. V. W.,
Harrisburg, Pa.
Reynolds, J. O..New York City
Rice, G. S.....New York City
Ridgway, R....New York City
Robinson, H. D.New York City
Rogge, J. C. L..New York City
Root, W. S.....New York City
Ropes, Horace..New York City
Rosenberg, F..Montclair, N. J.
Ryan, M. H....New York City

Safford, E. S...New York City
Sanborn, J. F..Brooklyn, N. Y.
Sanford, H. C..New York City
Sauer, A. F....Elizabeth, N. J.
Saunders, W. L.New York City
Schaub, J. W.....Chicago, Ill.
Schneider, C. C.,
Philadelphia, Pa.
Seaman, H. B..New York City
Sears, W. H...Katonah, N. Y.
Seaton, W., Jr..New York City
Sergeant, G., Jr.Brooklyn, N. Y.
Seurot, Paul....New York City
Shedd, Edward W.,
Providence, R. I.
Sherrerd, M. R..Newark, N. J.

Sickman, A. F..Holyoke, Mass.
Simpson, G. F..New York City
Skinner, F. W..New York City
Sleeper, G. E....Boston, Mass.
Slocum, C. M.Springfield, Mass.
Smith, Augustus.New York City
Smith, E. M.....Chicago, Ill.
Smith, J. W....New York City
Smith, L. C. L.,
Long Island City, N. Y.
Smith, M. H....New York City
Smith, Oberlin.Bridgeton, N. J.
Smith, W. F....New York City
Snare, F.....New York City
Snow, C. H.....New York City
Snow, F. A....Brookline, Mass.
Snow, J. P.....Boston, Mass.
Snyder, G. D...New York City
Soper, G. A.....New York City
Spencer, W. T.,
New Haven, Conn.
Spooner, A. N..New York City
Stanton, R. B...New York City
Stauffer, D. McN.,
New York City
Stearns, F. P....Boston, Mass.
Stepath, C. W..New York City
Stern, E. W....New York City
Stewart, J. M...New York City
Stickney, G. F..New York City
Stoddard, G. C..New York City
Strobel, C. L.....Chicago, Ill.
Strong, M. R....Passaic, N. J.
Stuart, F. L....Baltimore, Md.
Swensson, Emil..Pittsburg, Pa.
Swindells, J. S.Mt. Kisco, N. Y.

Taber, G. A....New York City
Taft, J. R.....New York City
Talbot, A. N.....Urbana, Ill.
Taylor, C. F....Boston, Mass.
Taylor, L. A....Boston, Mass.
Taylor, S. A....Pittsburg, Pa.
Thackray, G. E.Johnstown, Pa.
Theban, J. G...New York City
Thomas, G. E...New York City
Thomes, E. H..New York City
Thompson, S. C.New York City
Thompson, S. E.,
Newton Highlands, Mass.
Thompson, A., Jr.,
Brooklyn, N. Y.
Thomson, G. H.New York City
Thomson, T. K..New York City
Thorn, A. W....Buffalo, N. Y.
Tighe, J. L.....Holyoke, Mass.
Toch, Maximilian,
New York City
Tribus, L. L....New York City
Triest, W. G....New York City
Tucker, H. F.....Boston, Mass.
Tucker, L. W.,
Schenectady, N. Y.
Turner, D. L...New York City
Turner, E. K....Boston, Mass.

Ulrich, D.....New York City

Van Buren, J. D.,
New Brighton, N. Y.
Van Buskirk, C. R.,
Brooklyn, N. Y.
Van Horne, J. G.,
New York City
Venable, W. M..New York City
Vinton, T. M...New York City
Voynow, C. B.Philadelphia, Pa.
Vredenburgh, W., Jr.,
New York City

Waddell, J. A. L.,
Kansas City, Mo.
Wadsworth, J. E.,
New York City
Wagner, B. M..Flatbush, N. Y.
Wagner, J. C.Philadelphia, Pa.
Walker, J. W....Pittsburg, Pa.
Ward, C. R.....New York City

Waterhouse, J..New York City
Webster, W. R.Philadelphia, Pa.
Wegmann, E.,
White Plains, N. Y.
Wells, C. E.....Clinton, Mass.
Welton, B. F...New York City
Wendt, Edwin F.Pittsburg, Pa.
Wheeler, D. M.Worcester, Mass.
Whipple, G. C..New York City
Whiskeman, J. P.,
New York City
White, L.....Brooklyn, N. Y.
White, T. S..Beaver Falls, Pa.
Wilcock, F....Brooklyn, N. Y.
Wiley, W. H....New York City
Wilkes, J. K.,
New Rochelle, N. Y.
Wilkins, W. G...Pittsburg, Pa.
Williams, G. S.,
Ann Arbor, Mich.
Williamson, S. B.,
New York City
Wilson, C. W. S.,
New Rochelle, N. Y.
Winsor, F. E....Boston, Mass.
Wise, C. R.....Passaic, N. J.
Wolfel, P.....Ambridge, Pa.
Woodard, S. H.Scarsdale, N. Y.
Worcester, J. R..Boston, Mass.
Wortendyke, N. D.,
Jersey City, N. J.
Wright, J. B...New York City

York, H. W.....New York City
Young, C. G....New York City
Young, E. E...New York City.

SPECIAL COMMITTEE ON CONCRETE AND REINFORCED CONCRETE.

REPORT OF SUB-COMMITTEE ON PLAN AND SCOPE.

The sub-committee presents the following report for your consideration:

Reinforced concrete is comparatively new, but it has already become of great importance in engineering and architectural construction. The development of the Portland cement industry and the improvement of the product and the rapid extension of the use of concrete are among the noteworthy features of engineering progress in recent years. It is not too much to say that with the increased demand for permanence and better appearance in structures a very great extension of the use of reinforced concrete may be expected in the next few years. However, to ensure this development and to promote safe construction, a full knowledge of the properties and principles appertaining to reinforced concrete is needed. It is no reflection to say that our knowledge of reinforced concrete is imperfect. The very newness of this construction explains the paucity of information and diversity of opinions concerning it. But the lack of information and of experience in this work, and the carelessness or temerity of inexperienced or incompetent persons make the danger from accident and failure of structures very great. The importance of securing definite and complete knowledge of the principles underlying reinforced concrete construction before a serious accident caused by imperfect or improper construction injures the standing of reinforced concrete, is too apparent to need argument. Besides, the properties of concrete are not as regular or as well defined as those of such materials as structural steel, and the composite structure of steel and concrete may be expected to have a different action from that of the individual components. Recent investigations, too, seem not to confirm certain deductions considered by many to have been established. The need of a thorough and comprehensive investigation of the properties of reinforced concrete and of the principles underlying its design and construction is evident, and the sub-committee recommends that such an investigation be undertaken under the auspices of the joint committee and emphasizes the importance and the timeliness of such action to the engineering and constructional interests of the country.

It is true that many tests have been made on reinforced concrete, and much valuable information is in existence. However, some of the tests made show considerable difference in results and there is much diversity in their interpretation. These conflicting opinions extend to so many features and even to such fundamental principles that it seems best to begin with elementary matters and

to get at the subject from the foundation up. As the investigation proceeds the conditions accompanying tests already made may be more accurately learned and trustworthy data of such tests collected and utilized, and the collation of this information, which is a work of some magnitude, may be made a valuable part of the undertaking. However, a large purpose of the investigation should be to establish principles independently of existing opinions, or of preconceived ideas, and the principal present use of existing available data will be to direct the nature and scope of the work and to avoid unwarranted assumptions.

The scope of the investigation will include both (*a*) the determination of fundamental principles and properties, and (*b*) the choice of the main general conditions and requirements controlling the more common designs and constructions. The above distinction is not intended to imply that the conditions and requirements of design and construction are not dependent upon principles and properties, but rather that, as the investigation proceeds, the results may be utilized without waiting for the completion of the work outlined, and that in the selection of the order of the work to be undertaken the choice should be such that items of probable immediate applicability will be taken up at first. This attention to the order of the tests is warranted by the desire of railroad and structural men to get facts upon which to base construction at as early a day as possible. At the same time it must be borne in mind that the bearing of facts and experiments upon important fundamental principles may not be recognized in advance and that care must be taken not to prejudge results nor to base conclusions on insufficient evidence. Besides, if this investigation is worth undertaking, the subject-matter is worthy of a comprehensive treatment, and the Joint Committee cannot afford to stand sponsor for a superficial investigation.

The sub-committee recognizes that the field for investigation is very large. In the outline of work which follows, no effort has been made to cover the whole field. As the work progresses, modifications and extensions will need to be made. The order of the outline given has no reference to the order in which the tests should be undertaken, nor is it expected that all these tests may be made the first year. Some of the experiments may give negative results, but this fact will not lessen the importance of making them. Some are included because they may help to uncover the field for further investigation.

As stated under Supervision and Administration the plan is to have the tests made in the laboratories of engineering schools, railroads, etc., which have facilities for the work and which upon consultation express willingness to co-operate. It is expected that much

of the work will be done as thesis work by senior engineering students and that this will be greatly supplemented by volunteer investigators. Certain expenses will be defrayed from funds raised by the Committee on Ways and Means. Tests along special lines may require that special arrangements be made, and special apparatus may have to be provided. A committee to be known as the Committee on Tests will supervise the work, an inspector and other assistance will be furnished, and the management of the investigation will be as described under Supervision and Administration.

Uniformity and definiteness should be characteristic of the investigation. In the plan outlined, the selection of standard forms and proportions for test specimens, the description of the concrete and of the materials, and the general methods of testing are given in order that results of tests made at different places, at different times, and by different persons may be comparable. Some preliminary experimental work will be necessary before the standard test pieces can be finally fixed, and in any event some variations from the standard form and size of test pieces may have to be made. The properties and constants of the concrete used in the reinforced concrete test specimens will also, for purposes of comparison, be ascertained.

It is proposed by the plan to take up at the beginning the more simple constructions and the more fundamental principles and basic properties. Especial attention will be given to reinforced concrete beams, though columns and slabs will be taken up and plain concrete will be investigated to determine its properties and constants so far as they have a bearing upon reinforced concrete. Among the problems, variations, and determinations for reinforced concrete beams included in the scope of the work are the following: Amount of reinforcement; form, size and position of reinforcing bars; variety and consistency of concrete; carefulness of concrete making; repetition of load; manner of application of load; form of section; resistance to shearing; efficiency of devices and arrangements to resist shear; bond and anchorage; effect of age; general investigation of manner of failure and of the critical or controlling condition upon which the design of beams should be based. It will be seen that emphasis is placed on the stress-deformation relation, as this has so important a bearing on the action of reinforced concrete beams.

The scope of the work may be modified and extended as the development of the investigation warrants. Special problems coming up may need attention. It may be well in the report of the committee to formulate general regulations for the proper execution of work in reinforced concrete construction. It should be stated that the plan contemplates tests of reinforced concrete, using that term

to mean a construction composed principally of concrete and having a small amount of metal so embedded as to take the principal tensile stresses and perhaps the secondary tensile and shearing stresses developed, but not to any great extent the compressive stresses, and does not include what may be termed steel-concrete meaning thereby steel structures encased in concrete and using the concrete principally for stiffening and protection.

The outline of the plan and scope which follows is arranged as follows:

Scope of Investigation.

I. *Properties of Concrete.—A.* Compression; *B.* Tension; *C.* Shear; *D.* Flexure; *E.* Columns; *F.* Volumetric changes; *G.* Fire resisting properties.
II. *Properties of Reinforced Concrete under Simple Stresses.—A.* Compression; *B.* Tension; *C.* Initial Stresses; *D.* Bond and anchorage.
III. *Reinforced Concrete Beams.—A.* Simple flexure; *B.* Complex flexure; *C.* Restrained beams; *D.* Impact tests.
IV. *Reinforced Concrete Columns.*
V. *Reinforced Concrete Slabs.*

Testing Work.

I. *Materials and Mixing.*
II. *Test Pieces.*
III. *Testing.*

Supervision and Administration.

The full text of the plan and scope recommended is as follows:

SCOPE OF INVESTIGATION.

It shall be the purpose of the investigation to establish principles governing the action of the composite structure formed of steel and concrete and known as reinforced concrete, and to determine its properties and constants. The determination of the properties and constants of the concretes used will be made, so far as they have a bearing upon reinforced concrete.

I. Properties of Concrete.

A. Compression.

Stress-deformation relation, crushing strength, and form of structure are to be determined on all the varieties of concrete used in the tests and for the three consistencies named hereafter. 8 by 16-in. cylinders are to be used for this. Tests of a few 6-in. cubes

for the several varieties of concrete will be made to give opportunity for the comparison of strength of the concrete with that of other concretes.

1. General stress-deformation relation.
   Tests to be applied by a standard method which will be decided upon at a later time.
2. Time and repetition stress-deformation relations.
   (*a*) Comparison of relation when load is continuously applied and when load is released between successive applications of the increasing load. In this make an effort to determine the condition of the internal stresses in the concrete while load is being released and reapplied.
   (*b*) Effect of a number of repetitions of stress. Determine this effect and as far as possible the internal conditions and stresses for four different partial loads, using new test pieces for each partial load.
   (*c*) Rest effect. Determine the effect of rest upon a test piece partially loaded and then released.
   (*d*) Time effect. Determine the stress-deformation relation when load is left on test piece during say 3 days' time.
3. Effect of age upon stress-deformation relation.
   Use 7, 14, 28, 60 days and 6 months and 1 year.
4. Effect of applied stress upon setting properties.
   Get stress-deformation relation when loads are applied to test pieces during time of setting. Use two loads and two ages for loading.
5. Stress-deformation relation for abnormal concretes.
   Use concretes not having voids filled and having them overfilled and concretes which have not been compacted in making to determine the general effect of porosity. Use concretes which have set in abnormally hot and dry air to determine the effect of lack of moisture.

B. Tension.

Stress-deformation relation and breaking strength are to be determined on all the varieties of concrete used in the tests and for the three consistencies named, using the test pieces to be described.

1. Continuous loading.
2. Progressively released loading.

C. Shear.

The scope of the shearing tests of concrete will be outlined at a later time.

D. Flexure.

Determine from a series of beam tests the principal properties of the concretes used.

E. Columns.

This series will be coördinated with the tests of reinforced concrete columns.

F. Volumetric Changes.

1. Shrinkage and expansion changes in setting and nature and amount of stresses developed.
2. Temperature changes and stresses and coefficient of expansion.

G. Fire Resisting Properties.

This may not properly be included with the strength of concrete, but it may be considered desirable to have an investigation of the fire resisting properties of concrete under different conditions made.

II. Properties of Reinforced Concrete Under Simple Stresses.

A. Compression.

Stress-deformation relation, change in cross-section, and crushing strength are to be determined on all the varieties of concrete used for the three consistencies named, using the size of cylinder given for compression tests.

(*a*) Longitudinal reinforcement.

Use metal equal to 1% of the area of the test piece.

(*b*) Hooped reinforcement.

Hoops are to be 6 in. outside diameter, and are to be encased in concrete. Use two and three hoops of $\frac{3}{16}$-in. metal, varying the total width up to one-third of the height of test specimen. Also use hoops made of round rods.

B. Tension.

Stress-deformation relation and breaking strength are to be determined on all the varieties of concrete used in the tests and for the three consistencies named, using in general the test piece to be described.

1. General stress-deformation relation.

   Use three percentages of metal with both plain and deformed bars.
2. Effect of adhesion and grip of the concrete upon the elastic properties of steel, both before and after cracks appear in the concrete. Use a special form of test piece with two different amounts of encasing concrete.
3. Effect of initial stresses in both concrete and steel. This is to be taken in connection with the tests on initial stresses.

C. Initial Stresses.

Effect of volumetric changes (setting and temperature). Test piece and method to be decided upon later. Use one kind of aggregate, two mixtures and three consistencies. Determine relations for concretes (1) set in air and (2) set in water.

D. Bond and Anchorage.

The term bond will be used to include the resistance to the slipping of a bar in concrete due to (1) adhesive resistance along the surface of the bar, (2) frictional resistance resulting from the shrinkage and grip of the concrete on the bar, and (3) resistance due to irregularities or variation in shape of bar commonly known as deformed bars.

1. Plain bars.
   - (*a*) Effect of consistency of concrete. Use three proportions of water, and two mixtures of concrete.
   - (*b*) Effect of variety of concrete. Use the mixtures of concrete used in the reinforced concrete beams.
   - (*c*) Effect of condition of surface: scale, rust, oil, paint, etc.
2. Effect of shape of bar.
   - (*a*) Plain bars, round, square, flat (2).
   - (*b*) Deformed bars. Use the various patented forms of bar.
3. Anchorage.
   - (*a*) Bars with enlarged ends.
   - (*b*) Bars with ends bent.
   - (*c*) Bars connected to anchorage pins or plates.
4. Relative value of surface adhesive resistance and of grip. Make tests (*a*) for surface adhesive resistance, and (*b*) for combined friction and surface adhesion, making measurements of the shrinkage and swelling with different methods of storage (*i. e.,* immersed in water, stored in moist air, and stored in dry air).
5. Permanence of bond.
   - (*a*) Effect of chemical action on bond, including use of salt water.
   - (*b*) Effect of vibratory motion or unsteady loading.
   - (*c*) Effect of repetition of loading.
   - (*d*) Effect of impact.

III. Reinforced Concrete Beams.

A. Simple Flexure.

Simple flexure is here used to include flexural action which makes horizontal tensile and compressive stresses the controlling factors, as found in beams in which the dimensions and methods of loading do not necessitate special or unusual provision to resist shearing stresses and secondary or diagonal tensile and compressive stresses.

The general phenomena of the flexure will be observed as the load is applied. Observations will be made to determine the horizontal deformations, the deflection, position of neutral axis, time of appearance, nature, and growth of cracks, and general condi-

tions for loads up to the maximum load and in part of the beams for loads up to the ultimate load and final failure; also the amount of the maximum load and conditions governing it. Any other condition or appearance having a bearing upon the establishment of laws governing maximum load, allowable load, and permanence of structure under load or when subject to loading will be noted. For the principal series all the varieties of aggregate and all the mixtures of concrete will be used

1. Effect of amount of reinforcement. Use varying amounts of metal, ranging by say ¼% of area of cross-section from perhaps ¾% to an upper limit which will develop full compressive strength of the concrete and in some cases to an even larger amount. Use all the mixtures of concrete. Use plain steel bars of low (say 30 000 to 35 000 lb. per sq. in. elastic limit), medium (say 45 000 lb. per sq. in.), and high (say 60 000 lb. per sq. in.).
2. Effect of elastic limit of metal. This is included in the foregoing.
3. Effect of form, size, and position of reinforcing bar. Use two percentages of metal. Use best mixture of concrete and the wet consistency.
   (*a*) Deformed bars.
   (*b*) Round, square, and flat bars.
   (*c*) Bars in two layers.
4. Time tests, repetitions, and set.
   (*a*) Comparison of relation when load is continuously applied and when load is released between successive applications of the increasing load. Make an effort to determine the conditions of stress in the concrete while load is being released and applied.
   (*b*) Effect of a number of repetitions of load. Determine this effect, and as far as possible the internal conditions and stresses for four different partial loads, then continue the loading to failure, using new test pieces for each partial load.
   (*c*) Effect of rest upon a beam which has been loaded within the elastic limit of the steel and the load released. Use three partial loadings.
   (*d*) Effect of time upon deformation and deflection and set when load is left on beam for say three days. Use three partial loads.
5. Effect of uniform loading. Test beams with points of application of loads sufficiently numerous to approximate uniform loading and compare with the results of standard loading.

6. Tee sections, trapezoidal and other forms. The position of neutral axis, the limiting percentages of steel to develop crushing strength of concrete, and other properties will be determined for such mixtures and combinations as seem practicable after the work of the year has been further developed.
7. Composite beams. Effect of mixtures varying in richness or composition in the upper and lower layer and of the making of upper layer at a later time as when a floor slab is placed on a girder. This work is to be outlined at a later date.
8. Effect of size. Beams of different dimensions but having the same method and percentage of reinforcement will be tested to find whether results with the standard size used are applicable to beams having other dimensions.

B. Complex Flexure.

Complex flexure is here used to cover flexural action requiring the consideration and determination of internal stresses and deformations other than the horizontal tensile and compressive stresses commonly considered in beam action. The work will include an investigation of the needs and the effectiveness of various devices and arrangements for strengthening beams against shearing action and secondary or diagonal tensile and compressive stresses.

In addition to the observations and determinations named for the tests in Simple Flexure, such observations and measurements of deformations, cracks, and other conditions will be made as seem to have a bearing upon the determination of these shearing and secondary stresses and upon the effectiveness of provisions for resisting them. The detailed arrangements for these tests will require considerable thought and planning. One method will involve a variation in the point of application of the loads, changing from the middle toward the two ends, to vary the relative value of shear and horizontal stresses. For some of the arrangements beams of different lengths may be used. In general, the limiting amount of reinforcement will be used.

1. Effect of bending reinforcing bars into an inclined or diagonal position. Use both plain and deformed bars. Find effect of unsymmetrical loading. Use some weaker concretes as well to determine law.
2. Effect of stirrups and similar devices.
3. Effect of anchorage. This will include bent ends, enlarged ends, and ends tied to anchorage devices.
4. Effect of winged bars. This includes the so-called trussed bars.
5. Effect of deformed bars used in horizontal position. This series will be combined with the similar series of Simple Flexure.
6. Variations of some of the series above with tee-shaped and other sections, including putting reinforcement in two layers.

7. Effect of uniform loading. Tests beams with the points of application of the load sufficiently numerous to approximate uniform loading and compare with the results of standard loading.

C. Restrained Beams.

The work in this division will be outlined at a later time.

D. Impact Tests.

The work in this division will be outlined at a later time.

IV. Reinforced Concrete Columns.

The term column will here be used to mean a piece more than three diameters in length which is subject to compression in the direction of its length. The tests are intended to determine the principal deformations, the behavior of the column as loading progresses, the manner of failure, the maximum and ultimate loads, the tendency to crushing at the ends and the effect of variations in the end bearing, the relation of strength to the ratio of least diameter and length, and the effect of eccentricity of loading. The details of the series will be outlined at a later date.

1. Effect of longitudinal reinforcement.
2. Effect of hooped reinforcement.
3. Effect of combined reinforcement.

V. Reinforced Concrete Slabs.

The slabs are to be tested supported at four edges and fixed at four edges. It is probable that special apparatus will have to be constructed for these tests. Variations in size and thickness of slab and in method and amount of reinforcement will be made. This work will be outlined at a later date.

TESTING WORK.

I. Materials and Mixing.

1. *Cement.* The cement will be American Portland cement of the best grade used on concrete construction. Particular attention will be given to uniformity of quality to ensure a basis for comparison of results. Tests will be made according to the standard method of the American Society of Civil Engineers and the American Society for Testing Materials. The description and requirements for materials and mixing will be made more definite and complete when the scope of the test is more fully settled and when more is known concerning what materials are available.

2. *Sand.* The sand will be sharp torpedo sand with grains well graded in size, containing not more than 30% voids and not more than 5% of clay.
3. *Aggregate.* In the tests to determine general properties of concrete and reinforced concrete several forms of aggregate will be used, broken limestone, broken trap rock, gravel and cinders. For tests to determine special relations and effects only broken stone will be used. In order to secure a more uniform material, crusher dust will be excluded from broken stone. The stone will be screened through a 1-in. screen and over a ¼-in. screen. In order to get more definite proportions the gravel will be screened in the same way.
4. *Mixtures.* In general a balanced mixture of mortar and aggregate will be used, the volume of mortar being from 10% to 20% more than the voids of the aggregate. Two grades of mortar will be used, rich and medium. This will make for the broken stone something like 1-2-4 and 1-3-6 concretes.
5. *Mixing.* The specifications of the American Railway Engineering and Maintenance of Way Association will be used to secure thorough mixing. Considerable preliminary experimental study will be needed before framing full specifications for mixing and packing in the moulds in order to secure as nearly as possible the same results at different times, at different places, and by different persons, and the percentage of variation thereby resulting will need to be determined.
6. *Consistency.* An amount of water to make a wet rather than a dry concrete will be used. In some tests three consistencies will be used—moderately dry, moderately wet, and very wet.
7. *Tamping.*—The amount and manner of tamping is to be gauged by the consistency of the concrete, but an effort will be made to secure density and uniformity in the concrete.
8. *Storage.* In general the test pieces will be moistened for three or four days and then be stored exposed to ordinary atmospheric conditions in rooms having a temperature of 65° to 75° Fahr. during the time of year when artificial heat is needed. The conditions of abnormally dry atmosphere are to be avoided. A special series will be used to determine the effect of dry and hot atmospheric conditions.

II. Test Pieces.

In fixing the dimensions of test pieces, a size is desired which is large enough to minimize so far as possible the effect of uncontrolled or unseen irregularities of construction and setting, and to make the measurement of deformations and other changes large

enough to be accurately observed. At the same time the limits of the facilities of laboratories have been considered. Probably after principles have become better known, a few principal series should be repeated on a large scale. In addition to the test pieces named, it is considered highly desirable in order to ensure reliable results that at each of the laboratories where work is done several practice test pieces be made and that these be used in familiarizing those assisting in the work with the needs and difficulties of the tests but be not considered as counting in the final results. It is recognized that some variations from the form and size of test pieces here described may be necessary.

1. Compression.—The standard compression test piece will be a cylinder 8 in. in diameter and 16 in. long. A facing of mortar ¼ in. thick will be put at the top and the bottom. Cubes of 6-in. edge will be used to enable a comparison to be made with concretes used elsewhere. Preliminary tests will be made on cylinders of different lengths to determine whether the length of the standard cylinder should be modified and whether the quality of the concrete obtained corresponds to that made in the reinforced beam and column test piece.

2. Tension.—The standard tension test piece will be a cylinder 8 in. in diameter and 32 in. long. 3 in. at each end will be made of mortar and eight or twelve bolts will be embedded in this, connecting the test piece at either end with a stiff head in which a pulling bar with spherical bearing is set in a manner similar to the method used at the University of Illinois.

   For determining the effect of concrete upon the elastic properties of steel, a bar will be encased for part of its length in a concrete cylinder and the ends will project sufficiently to permit attachment of the extensometers and to permit the bar to be held in the testing machine. The cylinders will be of two or three sizes, perhaps 3, 4, and 6 in. diameter.

3. Bond and Anchorage.—For determining surface adhesive resistance, the bar will be laid on a block of concrete 6 in. long with one face embedded ⅛ in., and will project at one end sufficiently to allow the load to be applied. The block of concrete will be of such size and shape and have such bearing as to permit a direct pull on the bar.

   For the general tests for bond the bars will be encased in a cylinder 4 in. in diameter and 6 in. long, and one end will be flush with the end of the cylinder. Special forms of piece will be used for tests of anchorage.

4. Beams.—The standard beam test piece will be 8 in. wide, 11 in. deep, and 13 ft. long. The center of the reinforcing bars will be 10 in. below the top of the beam, except where they are bent

or inclined upward for a special purpose. The forms will be firmly braced to secure uniform cross-section. During construction the concrete will be well spaded along the side forms to secure a smooth surface. The top will be coated with a thin layer of mortar to remove irregularities. For beams of other than standard size special plans will be made.

5. Columns.—The size and form of column will be decided upon at a later date. 10 by 10-in. section and a length of 5, 10, 15 and 20 diameters is suggested. Larger sections will be used for special tests. The arrangement and distribution of the reinforcement will require further planning.
6. Slabs.—The outline for the form, size, and manner of reinforced concrete slabs will require further planning.
7. Miscellaneous Test Pieces.—The forms of test pieces for shear tests and for volumetric and other tests will be outlined when the work has been more fully developed.

III. Testing.

In order that uniformity may be secured and the results of tests made in different laboratories may be known to be comparable, it is important that common regulations be adopted. The making of these will involve consultation and discussion. What is here outlined is subject to change.

1. Compression.—Concentric loading is of prime importance in compression tests. Spherical bearing block, roller bearings, or hydraulic bearing block should be used. A thin layer of plaster of paris will be placed between test piece and bearing plate and allowed to set under a light load. The extensometer gauge length will be 12 in. The arrangement of extensometer will be such that flexural action in the test piece will be nullified as far as seems possible.
2. Tension.—The arrangement for testing tension pieces will be such as to give a direct pull and avoid flexural stresses in the test piece. In general the extensometer gauge length will be 24 in. The arrangement of the contact points and gauge bars of the extensometer will be such that the effect of flexural action in the test piece will be slight. Bars for use in test for effect of concrete encasing upon elastic properties of steel will first have the modulus of elasticity of the naked steel determined.
3. Beams.—The method of applying the load is an important consideration. One great defect found in many tests of reinforced concrete beams is the indefiniteness of the distribution of the load, and in some tests the loading used must have

acted to strengthen the beams. As used in structures, reinforced concrete beams are subject to both uniform and concentrated loads, and tests should cover both conditions. The general standard loading selected has the load applied equally at two points, the one-third points of the span. This loading does not differ greatly in maximum bending moment and in shear at the end from the conditions for uniform loading and has the advantage for the measurement of deformations that the moment except for that due to the dead load is equal at all points between the two load points. Series of tests will be made with the load applied equally at points sufficiently numerous to approximate to the conditions of uniform loading and also series with concentrated loading. The beam supports and the method of applying the load must give good bearing and allow adjustment for warped condition of beams and for free changes in distances between these points. In general the extensometer gauge length will be about one-third of the span length. The general standard for test span will be 12 ft. Deflections will be observed for the middle of the span length.

4. Miscellaneous Tests.—The method of testing columns and slabs and of testing for shearing resistance is reserved for future consideration.

5. Method of Applying Loads.—Different methods of applying loads will give quite different results. The effect of continuous, progressive loading, loading released after each observation, and progressive loading with the load released two or three times should be investigated. The choice of a standard method of applying the load should be postponed until preliminary tests have been made, as the decision of this point is a matter of importance.

6. Duplication of Tests and Number of Test Pieces.—In general one more test piece will be made than required for the series, the extra one to be used in case of accident to another or of marked disagreement among the others. For compression, tension, shear and bond, five test pieces will be made and four will constitute a series. For beams, slabs and columns, three test pieces will be made and two will constitute a series. Some of the more important series of tests will be duplicated, the work being done in two laboratories.

7. Age for Testing.—In general, the standard age for testing will be 60 days after the test piece is made.

The number of mixtures of concrete to be used for any line of investigation is not always fully stated in the outline. Further attention will be given to this.

SUPERVISION AND ADMINISTRATION.

It is the plan to have these tests made in the laboratories of engineering schools, railroads, etc., which have facilities for the work, and which upon consultation express willingness to co-operate. It is expected that much of the work will be done as thesis work by senior engineering students, and that this will be greatly supplemented by volunteer investigators. The expense of materials and transportation, and of extra labor employed in making, handling, and testing the test pieces will be defrayed from funds raised by the Committee on Ways and Means.

The general conduct of the investigation will be in charge of a committee of five members to be called the Committee on Tests. In the prosecution of the work it will be very necessary to know conditions and results and to insure uniformity of methods and correlation of work. This will involve considerable correspondence, travel, and supervision, and the committee should have suitable and sufficient assistance. Inspectors will be employed who will be under direction of the Committee in Charge of Tests. They will aid in arranging for tests, in doing testing work, and in putting results in permanent form, and will consult and confer with the laboratories doing work. The inspectors will be able to be of much service in formulating blanks, collecting existing data, and generally assisting in the investigation. Other help will be employed as needed.

The results of tests made at any institution may be used by the institution, but they shall not be published by students. Individuals connected with the laboratories may publish results, with the consent of the Joint Committee on Reinforced Concrete.

The above outline of plan and scope of the investigation is somewhat tentative and is necessarily incomplete and in some respects indefinite. When it is known more fully what work will be undertaken, full plans and regulations may be made. It may not be feasible to carry out all the work outlined during the first year, and it is not unlikely that developments in the investigation will show the necessity of repetition and modification in succeeding years.

The sub-committee realizes the magnitude of the task proposed, but it desires to emphasize the importance of the undertaking and to express its belief that the results of such an investigation carried out in a thorough and comprehensive way would be of great value to the engineering world.

A. N. Talbot,
W. K. Hatt,
J. W. Schaub,
Committee on Plan and Scope.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, March 1st, 1905.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper entitled "Technical Methods of River Improvement, as Developed on the Missouri River, by the General Government, from 1876 to 1903," by S. Waters Fox, M. Am. Soc. C. E., will be presented for discussion.

This paper was printed in *Proceedings* for January, 1905.

Wednesday, March 15th, 1905.—8.30 P. M.—At this meeting a paper entitled "The Compensating Works of the Lake Superior Power Company," by G. F. Stickney, Assoc. M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings*.

ANNUAL CONVENTION.

The Thirty-Seventh Annual Convention will be held in Cleveland, Ohio, June 20th-23d, 1905. The following Committees have been appointed to take charge of the arrangements.

COMMITTEE OF THE BOARD OF DIRECTION:

ALFRED CRAVEN, *Chairman;*
N. P. LEWIS,
W. J. WILGUS,
CHARLES S. GOWEN,
CHAS. WARREN HUNT.

LOCAL COMMITTEE:

A. MORDECAI, *Chairman;*

WM. J. CARTER,
HARRY FULLER,
E. A. HANDY,
A. M. JOHNSTON,
M. W. KINGSLEY,
J. FRANCIS LE BARON,
F. C. OSBORN,
W. P. RICE,
J. RITCHIE,
W. H. SEARLES,
S. T. WELLMAN,
C. H. WRIGHT.

PRIVILEGES OF LOCAL SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

The Boston Society of Civil Engineers will welcome any member of the American Society of Civil Engineers at its library and reading room, 517 Tremont Temple, Boston, which is open on week days from 9 A. M. to 5 P. M. Members will also be welcome at the meetings, which are held in the same building, on the evenings of the fourth Wednesday in January, and the third Wednesdays of other months, except July and August.

The rooms of **The St. Louis Engineers' Club** are in the business center of St. Louis, and visiting engineers are cordially invited to use them for mail, telephone service, information, etc.

The courtesies of **The Engineers' Society of Western Pennsylvania** have been extended to members of the American Society of Civil Engineers. The rooms of the Society, 410 Penn Ave., Pittsburg, Pa., are open at all times, and meetings are held as follows, except during July and August. REGULAR SECTION, Third Tuesdays; CHEMICAL SECTION, Thursdays following third Tuesdays; MECHANICAL SECTION, First Tuesdays; STRUCTURAL SECTION, Fourth Tuesdays.

The Western Society of Engineers, Monadnock Block, Chicago, Ill., tenders to members of this Society the use of its rooms and facilities, together with the good offices of its Secretary and of a special committee appointed for that purpose.

The Civil Engineers' Club of Cleveland, Ohio, invites members of this Society to make use of the Club rooms, at any time when in Cleveland. Cards will be furnished on application to the Secretary, Mr. J. C. Beardsley.

The Engineers' Club of Central Pennsylvania has established new quarters at the corner of Second and Walnut Streets, Harrisburg, Pa., and desires to extend the courtesies of the Club to visiting members of the American Society of Civil Engineers.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an

engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

INTERNATIONAL ENGINEERING CONGRESS PUBLICATIONS.

The first two volumes of the Proceedings of the International Engineering Congress are nearly ready for distribution to all Members elected prior to December 31st, 1904. There will be six volumes in all. Members have been notified that they would receive these volumes (issued as Parts A, B, C, D, E and F of Vol. LIV of *Transactions*) and asked whether they wished them bound in one of the Standard Bindings. A number of Members who have their Volumes bound regularly have not responded, and consequently will receive these volumes in paper covers, unless an order is received at once for their binding. It is urged that all who care to have these volumes bound, and who have not already done so, send in an order for such binding immediately.

DONATIONS.*

* Unless otherwise specified, books in this list have been donated by the publisher.

LOCKS AND HARDWARE.

By Henry R. Towne. Leather, 7 x 5 in., illus., 1 117 pp. New York, John Wiley & Sons. London, Chapman & Hall, Limited, 1904. $3.

The preface states that this work is a combined handbook of technical information and ready-reference catalogue of locks and hardware to meet the needs of the architectural profession. The author's experience of thirty years as a manufacturer, it is stated, is a justification for attempting this volume. Preceded by a glossary of technical terms, the arrangement of the book is as follows: Part I, Narrative and Historical; II, Mechanics of Hardware; III, Art Metal Work and Ornament; IV, Locks and Latches; V, Locks in Sets; VI, Plain Hardware; VII, Hardware Groups; VIII, Cabinet Hardware; IX, Specifications, etc.; X, Miscellaneous Information. There is an alphabetical index of ten pages, and a numerical index of fourteen pages. Ornamental hardware is also arranged, alphabetically, by designs and by schools in the section devoted to that subject.

ELEMENTS OF MECHANISM.

By Peter Schwamb and Allyne L. Merrill. Cloth, 9 x 6 in., illus., 6+264 pp. New York, John Wiley & Sons. London, Chapman & Hall, Limited, 1904. $3.

The preface states, that the main subject-matter of this work was written during 1885, as a basis for instruction in mechanism at the Massachusetts Institute of Technology. The notes have been revised and such changes and additions made as experience has proved advisable. The authors have endeavored to make the manner of presenting the subject, systematic, clear and practical. Such available material has been used as appeared best to accomplish the object desired and very little claim is made as to its originality. There is an index of ten pages.

RAILWAY RIGHT-OF-WAY SURVEYING.

By Albert I. Frye, M. Am. Soc. C. E. Cloth, 9 x 6 in., 9+45 pp. New York, *Engineering News* Publishing Company, 1904.

It is stated in the preface, that this book outlines a modern system of right-of-way surveying, leveling and mapping. Though the system as a whole applies particularly to railroads, the "adjustment diagram" will be found useful in the special adjustment of streets, canals, highways and old boundary lines. This method of survey must not be confused with the common one of using the outside head of rail as a base line for locating the various structural features. Vast sums of money have been spent for such surveys, leaving no permanent field reference to lines run and recording sets of maps without any measurements whatever. The system here presented, it is stated, gives the most accurate, available and permanent records, and reduces the important field measurements and office data to rectangular coordinates referred to an established center line. The Journal and Ledger system is a definite plan of rearranging and tabulating data as obtained.

THE ARCHITECTS' DIRECTORY AND SPECIFICATION INDEX, 1904-05.

Containing a Complete List of the Architects in the United States and Canada. Edition 6. Cloth, 10 x 7 in. New York, William T. Comstock, 1904. $2 net.

This edition has several new features, such as the number of architectural firms in each state, and the total number for the United States and for Canada, the latest schedule of architect's charges, and also a list of Landscape Architects and one of Naval Architects. It is stated that a very complete list of architectural societies is presented, with the names of the principal officers and their location, and in the list of architects, abbreviations are given against each name indicating membership. The name and location of architectural schools and periodicals are also given. Under the heading Specification Index are classified the more important names and addresses of manufacturers and dealers in building materials and appliances.

AIR-BRAKE TESTS.

Compiled and Published by the Westinghouse Air Brake Company; in Connection with its Exhibit of Braking Appliances at the Louisiana Purchase Exposition. Leather, 7 x 5 in., illus., 323 pp. Wilmerding, Pa., Westinghouse Air Brake Company, 1904.

This work contains the history of the brake from the beginning of its use on the old "Diligence" more than 250 years ago. But the primary purpose, it is stated, is to present in a comprehensive way and at the same time in condensed form, the data that has resulted from the most significant and valuable of the practical tests made under conditions found in actual service, with such comment as the wider experience of the day seems to justify. The contents are: The Growth of Car Braking; Galton-Westinghouse Tests; Paris and Lyons Railway Tests; The Burlington Trials (C., B. & Q. R. R.); Westinghouse Freight Train Trials; The Karner Trials (N. Y. C. & H. R. R. R.); Sang Hollow Tests (P. R. R.); Shiproad Tests (P. R. R.); Nashville Locomotive Brake Tests; Absecon Tests (P. R. R.); Atsion Tests (C. R. R. of N. J.)

A TEXT-BOOK ON ROOFS AND BRIDGES.

Part I, Stresses in Simple Trusses. By Mansfield Merriman, M. Am. Soc. C. E., and Henry S. Jacoby, Assoc. Am. Soc. C. E. Edition 6. Cloth, 9 x 6 in., 10+316 pp., illus. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1905. $2.50.

This volume has been rewritten and reset to properly record the changes that have taken place, in the science and art of the construction of simple bridges, since 1888, when the first edition was published; and to give the student the latest point of view. The preface states that many historical and critical notes have been introduced, showing the best modern practice. The former classification for bridges has been abandoned and one involving loads has been introduced, the dead load stresses, the live load stresses, the stresses due to wind and other causes are treated in separate chapters for the common forms of simple trusses. The modern long span bridges are treated in Chapter V, more than half the material is entirely new, as is all of that given in Chapter VI, which treats of portal and sway bracing, bridge members and floors and plate girders. Chapter VII treats of deflections, and the demonstration that the economic depth of a truss is closely the one which gives greatest stiffness, the authors believe to be new. Cranes, bents, towers, viaducts and other miscellaneous structures are discussed in Chapter VIII. There is an index of nearly four pages.

Gifts have also been received from the following:

Allen, Kenneth. 1 pam.
Am. Ry. Assoc. 1 pam.
Am. Soc. Mech. Engrs. 1 pam.
Boston—Public Lib. 1 vol.
Cal.—Dept. of Highways. 1 pam.
Cambridge—Water Board. 1 vol.
Case School of Applied Sci. 1 vol.
Coast and Geodetic Surv. 1 pam.
Colo.—Coll. Agri. Exper. Station. 1 pam.
Conn.—State Board of Health. 1 bd. vol.
Dudley, C. B. 1 pam.
Fitch, G. D. 1 vol.
Ind.—Board of Health. 1 bd. vol.
Inst. of Civ. Engrs. 2 vols.
Inst. of Min. & Metallurgy. 1 bd. vol.
Interborough Rapid Transit Co. 1 bd. vol.
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Linders, Olaf. 1 pam.
Mass.—Harbor & Land Commrs. 1 bd. vol.
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Mexican Central Ry. Co. Ltd. 1 pam.
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National Assoc. of Mfgrs. of Sand-Lime Products. 1 pam.
N. Y., R. R. Branch, Y. M. C. A. 1 vol.
N. Y.—State Engr. & Surv. 1 vol.
Oberlin Coll. 1 pam.
Ontario—Bureau of Mines. 1 bd. vol.
Ontario Land Surv. 1 pam.
Ontario—Provincial Board of Health. 1 pam.
Oswego Historical Soc. 1 vol.
Plainfield Pub. Lib. 1 pam.
Pontzen, Ernest. 1 pam.
Poor's R. R. Manual Co. 2 pam.
Ry. Signal Assoc. 1 vol.
Rhode Island—State Board of Health. 1 bd. vol.
Richardson, H. B. 1 pam.
Rugby Eng. Soc. 1 bd. vol.
St. Louis and San Francisco R. R. Co. 1 pam.
Schmidt, M. E. 1 pam.
Sherwood, F. A. 1 vol.
South Eastern Ry. Co. 1 pam.
Troy—City Engr. 1 bd. vol.
U. S. Commr. of Navigation. 1 bd. vol.
U. S. Engrs. School of Application. 1 pam.
U. S. Forestry, Bureau of. 1 pam.
U. S. Geol. Surv. 1 vol., 3 pam.
U. S. Interstate Commerce Comm. 1 bd. vol.
U. S. Lib. and Naval War Records. 1 pam.
U. S. Office of Exper. Stations. 1 pam.
U. S. Office of Pub. Road Inquiries. 1 pam.
U. S. War Dept. 17 Specif.
Univ. of Ill. 1 pam.
Univ. of Mich. 1 pam.
Univ. of Pa. 1 vol.
U. S.—Patent Office. 1 vol.
Unknown. 1 pam.
Waddell, J. A. L. 2 pam.
Watuppa Water Board. 1 pam.
Wyoming—State Geologist. 1 pam.

BY PURCHASE.

The Purification of Sewage. Being a Brief Account of the Scientific Principles of Sewage Purification and their Practical Application. By Sidney Barwise. Edition 2. New York, D. Van Nostrand Company, 1904.

Alternating Current Engineering; Practically Treated. By E. B. Raymond. New York, D. Van Nostrand Company, 1904.

War-Ships; A Text-Book on the Construction, Protection, Stability, Turning, etc., of War Vessels. By Edward L. Attwood. New York, Longmans, Green & Company, 1904.

Cours de Navigation Intérieure. Vol. III. Canaux. Par F. B. de Mas. Paris, Ch. Béranger, 1904.

A Treatise on Civil Engineering; By W. M. Patton. Edition 2. New York, John Wiley & Sons. London, Chapman & Hall, Limited, 1903.

The Materials of Construction; a Treatise for Engineers on the Strength of Engineering Materials. By J. B. Johnson. Edition 4, revised and enlarged. New York, John Wiley & Sons. London, Chapman & Hall, Limited, 1904.

Verdampfen, Kondensieren und Kühlen; Erklärungen, Formeln und Tabellen für den Praktischen Gebrauch. Von E. Hausbrand. Edition 3, revised. Berlin, Julius Springer, 1904.

Electric Smelting and Refining; the Extraction and Treatment of Metals by Means of the Electric Current. By W. Borchers. Second English edition. London, Charles Griffin & Company, Limited, 1904.

SUMMARY OF ACCESSIONS.

January 11th to February 7th, 1905.

Donations (including 4 duplicates)	90
By purchase	8
Total	98

MEMBERSHIP.

ADDITIONS.

HONORARY MEMBERS.

	Date of Membership.
GORSUCH, ROBERT BENNETT. Apartado del Correo 226, City of Mexico, Mexico	Jan. 9, 1905
WHITE, *Sir* WILLIAM HENRY. Cedarcroft, Bristol Gardens, Putney Heath, S. W., London, England	Dec. 16, 1904

MEMBERS.

ALLEN, HENRY CLAYTON. Special Deputy State Engr., DeGraaf Bldg., Albany (Res., 206 Delaware St., Syracuse), N. Y.	Assoc. M.	July 1, 1891
	M.	Jan. 3, 1905
BURNS, CLINTON SUMNER. Civ., Hydr. and San. Engr. (Burns & McDonnell), 509 Dwight Bldg., Kansas City, Mo.	Assoc. M.	Feb. 1, 1899
	M.	Jan. 3, 1905
CHRISTY, GEORGE LEWIS. 128 West 42d St., New York City	Jun.	June 6, 1893
	Assoc. M.	Nov. 4, 1896
	M.	Jan. 31, 1905
CLARKE, ERNEST WILDER. Res. Engr., Water-Works and Sewers, Isthmian Canal Comm., Cristobal, Canal Zone, Panama		Jan. 4, 1905
CONKLING, CLOUD CLIFFORD. Chf. Civ. Engr., Lackawanna Steel Co., 385 Richmond Ave., Buffalo, N. Y.		Jan. 4, 1905
COSBY, SPENCER. Capt., Corps of Engrs., U. S. A., Manila, Philippine Islands		Oct. 5, 1904
CROZIER, WILLIAM. Brig.-Gen., Chf. of Ordnance, U. S. A., War Dept., Washington, D. C.		Feb. 1, 1905
EASBY, WILLIAM, Jr. Asst. Prof. of Civ. Eng., College Hall, Univ. of Pennsylvania, Philadelphia, Pa.		Jan. 4, 1905
FLOESCH, JACOB MARTIN. Chf. Engr., B. R. & P. Ry. Co., Rochester, N. Y.		Jan. 4, 1905
FORD, PORTER DWIGHT. Cons. and Constr. Engr., Park Row Bldg., New York City		Jan. 4, 1905
GASTON, LOUIS PREVOST. 143 Liberty St., New York City.		Feb. 1, 1905
HALLSTED, JAMES COTTLE. 66 Broadway, New York City.		Jan. 4, 1905
KNICKERBOCKER, CURTIS EDWIN. Engr., M. of W., N. Y., O. & W. Ry. Co., Middletown, N. Y.		Feb. 1, 1905
KNIGHTON, JOHN ALBERT. Asst. Engr., Bridge Dept., 519 West 124th St., New York City		Jan. 4, 1905
NEWMAN, EMIL. 1048 West 8th St., Los Angeles, Cal.		Jan. 4, 1905
SMEAD, RAPHAEL CHART. 2728 Pennsylvania Ave., N. W., Washington, D. C.		Feb. 1, 1905
SNOW, FRANKLIN AUGUSTUS. 523 Washington St., Brookline, Mass		Jan. 4, 1905
TRIEST, WOLFGANG GUSTAV. V. P., The Snare & Triest Co., 39 Cortlandt St., New York City	Jun.	Sept. 3, 1890
	Assoc.	Mar. 6, 1900
	M.	Jan. 31, 1905

		Date of Membership.
WRIGHT, JOSEPH BODINE. Cons. Engr., Steel and Concrete-Steel, 2528 Broadway, New York City	Assoc. M.	June 2, 1897
	M.	Jan. 31, 1905

ASSOCIATE MEMBERS.

BABCOCK, WILLIAM STUART. 17 Battery Pl., New York City		Feb. 1, 1905
BELKNAP, FRANCIS WHEELWRIGHT. Engr., Phœnix Constr. & Supply Co., 517 East 80th St., New York City		Feb. 1, 1905
BOARDMAN, HOWARD EDWARD. Chf. of Party, North Riv. Div., P., N. Y. & L. I. R. R., 558 West 33d St., New York City	Jun.	Oct. 7, 1902
	Assoc. M.	Jan. 4, 1905
COLE, HARRY OUTEN. 547 Carlton Ave., Brooklyn, N. Y.		Jan. 4, 1905
CONROW, HERMAN. Contr. Engr., Moorestown, N. J.	Jun.	May 3, 1898
	Assoc. M.	Jan. 4, 1905
DOTY, JOHN WILLIAMS. Care, Foundation & Constr. Co., 35 Nassau St., New York City	Jun.	Nov. 3, 1903
	Assoc. M.	Jan. 4, 1905
FENTON, LOUIS GILLESPIE. 22 William St., New York City		Feb. 1, 1905
GRAVES, WILLARD FRANKLIN. Asst. Engr., So. Side Elev. Ry., 450 Thirty-seventh Pl., Chicago, Ill	Jun.	Oct. 31, 1899
	Assoc. M.	Jan. 4, 1905
HOLLIDAY, ALEXANDER RIEMAN. Engr., M. of W., I. & V. Div., Penn. Co., Union Station, Indianapolis, Ind	Jun.	Oct. 7, 1902
	Assoc. M.	Feb. 1, 1905
JACKSON, GRANBERY. Vanderbilt Univ., Nashville, Tenn.		Jan. 4, 1905
LELAND, ORA MINER. 127 Cascadilla Pl., Ithaca, N. Y.		Feb. 1, 1905
MACHEN, HENRY BENNETT. Asst. Engr., Rapid Transit R. R. Comm. (Res., 315 West 95th St.), New York City	Jun.	May 2, 1899
	Assoc. M.	Feb. 1, 1905
MCCONNELL, IRA WELCH. Montrose, Colo.		Dec, 7, 1904
MCPHERSON, ROBERT HENRY. Room 2515, Park Row Bldg., New York City		Jan. 4, 1905
OAKES, LUTHER STEVENS. Asst. Engr., N. P. Ry., Pier 2, Seattle, Wash		Jan. 4, 1905
PATCH, WALTER WOODBURY. Asst. Engr., Aqueduct Comm., Jerome Park Reservoir, Kingsbridge, New York City		Sept. 7, 1904
SHIRE, MOSES EDMUND. Engr. in Chg., Chicago Union Transfer Ry. Co., 1618 Tribune Bldg., Chicago, Ill	Jun.	April 2, 1901
	Assoc. M.	Jan. 4, 1905
STEARNS, FRED LINCOLN. Dist. Supt. of Street Cleaning, 52 West 126th St., New York City	Assoc.	June 3, 1902
	Assoc. M.	Jan. 31, 1905
VAIL, JOHN JERVIS. 102 Fulton St., Rahway, N. J.		Jan. 4, 1905
WHITFORD, NOBLE EARL. 11 South Lexington Ave., Albany, N. Y.		Feb. 1, 1905

JUNIORS.

	Date of Membership.
Barrett, Robert Edward. Framingham, Mass	Jan. 31, 1905
Black, Roger Derby. 2d Lieut., Corps of Engrs., U. S. A., War Dept., Washington, D. C	Jan. 3, 1905
Constance, Edward Cartwright. 428 Custom House, St. Louis, Mo	Dec. 6, 1904
Gilman, Charles. 430 West 118th St., New York City	Dec. 6, 1904
Hogan, John Philip. 430 West 118th St., New York City.	Dec. 6, 1904
Hunting, Eugene Nathan. Concrete Steel Engr., 609 House Bldg., Pittsburg, Pa	Nov. 1, 1904
Lindsley, Thayer. 157 West 47th St., New York City	Jan. 3, 1905
Slocum, Curlys Lyon. Room 301, R. R. Bldg., New Haven, Conn	Jan. 3, 1905
Spalding, Walter James. Eng. Aid, Reclamation Service, U. S. Geological Survey, P. O. Box S, Salt Lake City, Utah	Nov, 1, 1904
Stephenson, Stuart Augustus, Jr. Eng. Dept., P. R. R. Co., Office of Asst. Engr. of Constr., Newark, N. J.	Jan. 3, 1905
Van Suetendael, Achille Octave. Yonkers, N. Y	Jan. 3, 1905
Waite, Donald Cramer. 17 Greenvale Ave., Yonkers, N. Y	Jan. 3, 1905
Whitbeck, Lee Field. Care, Rankin Johnson, Durango, Dgo., Mexico	Dec. 6, 1904

RESIGNATIONS.

ASSOCIATE MEMBERS.

	Date of Resignation.
Grandy, Albion Lorenzo	December 31st, 1904

ASSOCIATES.

Stouder, John Burton	December 31st, 1904

JUNIORS.

Anthony, Walter Loring	December 31st, 1904
Tilt, Garret Edward	December 31st, 1904

DEATHS.

Frank, George William.—Elected Member, February 1st, 1899; died January 19th, 1905.

Gould, Edward Sherman.—Elected Member, November 4th, 1885; died January 24th, 1905.

Lindenberger, Cassius Howard.—Elected Associate, February 2d, 1892; died January 5th, 1905.

Pope, Macy Stanton.—Elected Associate Member, May 2d, 1900; died December 10th, 1904.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(January 9th, 1905, to February 3d, 1905.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal,* Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings,* Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal,* Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal,* Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions,* Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly,* Columbia Univ., New York City, 50c.
(7) *Technology Quarterly,* Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator,* Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine,* New York City, 25c.
(10) *Cassier's Magazine,* New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News,* New York City, 15c.
(14) *The Engineering Record,* New York City, 12c.
(15) *Railroad Gazette,* New York City, 10c.
(16) *Engineering and Mining Journal,* New York City, 15c.
(17) *Street Railway Journal,* New York City, 35c.
(18) *Railway and Engineering Review,* Chicago, Ill., 10c.
(19) *Scientific American Supplement,* New York City, 10c.
(20) *Iron Age,* New York City, 10c.
(21) *Railway Engineer,* London, England, 25c.
(22) *Iron and Coal Trades Review,* London, England, 25c.
(23) *Bulletin,* American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal,* New York City, 10c.
(25) *American Engineer,* New York City, 20c.
(26) *Electrical Review,* London, England.
(27) *Electrical World and Engineer,* New York City, 10c.
(28) *Journal,* New England Water-Works Assoc., Boston, $1.
(29) *Journal,* Society of Arts. London, England, 15c.
(30) *Annales des Travaux Publics de Belgique,* Brussels, Belgium.
(31) *Annales de l'Assoc. des Ing. Sortis des Ecole Speciales de Gand,* Brussels, Belgium.
(32) *Memoires et Compte Rendu des Travaux,* Soc. Ing. Civ. de France, Paris, France.
(33) *Le Genie Civil,* Paris, France.
(34) *Portefeuille Economique des Machines,* Paris, France.
(35) *Nouvelles Annales de la Construction,* Paris, France.
(36) *La Revue Technique,* Paris, France.
(37) *Review de Mecanique,* Paris, France.
(38) *Revue Generale des Chemins de Fer et des Tramways,* Paris, France.
(39) *Railway Master Mechanic,* Chicago, Ill., 10c.
(40) *Railway Age,* Chicago, Ill., 10c.
(41) *Modern Machinery,* Chicago, Ill., 10c.
(42) *Transactions,* Am. Inst. Elect. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussées,* Paris, France.
(44) *Journal,* Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals,* Scranton, Pa., 20c.
(46) *Scientific American,* New York City, 8c.
(47) *Mechanical Engineer,* Manchester, England.
(48) *Zeitschrift,* Verein Deutscher Ingenieure, Berlin, Germany.
(49) *Zeitschrift für Bauwesen,* Berlin, Germany.
(50) *Stahl und Eisen,* Düsseldorf, Germany.
(51) *Deutsche Bauzeitung,* Berlin, Germany.
(52) *Rigasche Industrie-Zeitung,* Riga, Russia.
(53) *Zeitschrift,* Oesterreichischer Ingenieur und Architekten Verein, Vienna, Austria.
(54) *Transactions,* Am. Soc. C. E., New York City, $5.

(55) *Transactions,* Am. Soc. M. E., New York City, $10.
(56) *Transactions,* Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian,* London, England.
(58) *Proceedings,* Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions,* Mining Inst. of Scotland, London and Newcastle-upon-Tyne, England.
(60) *Municipal Engineering,* Indianapolis, Ind., 25c.
(61) *Proceedings,* Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World,* 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings,* Inst. C. E., London, England.
(64) *Power,* New York City, 20c.
(65) *Official Proceedings,* New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting,* London, England, 15c.
(67) *Cement and Engineering News,* Chicago, Ill., 25c.
(68) *Mining Journal,* London, England.
(69) *Mill Owners,* New York City, 10c.
(70) *Engineering Review,* New York City, 10c.
(71) *Journal,* Iron and Steel Inst., London, England.
(72) *Street Railway Review,* Chicago, 30c.
(73) *Electrician,* London, England, 18c.
(74) *Transactions,* Inst. of Min. and Metal., London, England.
(75) *Proceedings,* Inst. of Mech. Engrs., London, England.
(76) *Brick,* Chicago, 10c.
(77) *Journal,* Inst. Elec. Engrs., London, England.
(78) *Beton und Eisen,* Vienna, Austria.
(79) *Forscherarbeiten,* Vienna, Austria.
(80) *Tonindustrie-Zeitung,* Berlin, Germany.
(81) *Zeitschrift fur Architektur und Ingenieurwesen,* Wiesbaden, Germany.
(82) *Dinglers Polytechnisches Journal,* Berlin, Germany.

LIST OF ARTICLES.

Bridge.

General Methods for the Calculation of Statically Indeterminate Bridges, as Used in the Check Calculations of Designs for the Manhattan Bridge and the Blackwell's Island Bridge, New York.* Frank H. Cilley. (54) Vol. 53.
The Nantes Transfer-Bridge.* (11) Jan. 13.
The Boston Bridge Works.* (14) Jan. 14.
The Substructure of the Cambridge Bridge, Boston.* (14) Jan. 14.
A 100-Foot Plate-Girder Span with Unusual Bearings.* (14) Jan. 14.
Trunnion Bascule Bridge at Northwestern Ave., Chicago.* (13) Jan. 19.
The Bethlehem Junction Bridge.* (14) Jan. 21.
The Reconstruction of the Point Bridge, Pittsburg, Pa.* Willis Whited. (13) Jan. 26.
The Ashtabula Concrete Bridge of the Lake Shore.* (15) Jan. 27.
Rebuilding the Big Four Bridge at Terre Haute.* (15) Jan. 27.
The Suspension Bridge Failure at Charleston, West Virginia.* Addison M. Scott, M. Am. Soc. C. E. (13) Feb. 2.
Comparisons of Full-Sized and Specimen Tests of Very Large Steel Eye-Bars. (13) Feb. 2.
Le Pont Troïtsky, à Saint-Pétersbourg, Commande Électrique de la Partie Tournante.* (33) Jan. 21.
Die Fahrbahn der neuen Mont Blanc Brücke in Genf.* (78) Pt. 1, 1905.
Berechnung der Scheitelstärke Steinerner Dreigelenkbrücken.* Wilh. Schnidtmann. (51) Dec. 30.
Balkenbrücke in Eisenbeton in Bamberg.* Luft. (51) Jan. 2.
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Streben-Auswechslung mit einem Zugstangen-Systeme an einer Eisenbahn-Gitterbrücke.* Julius Novák. (53) Jan. 13.

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Some Interesting Phases of Long-Distance Telephony.* S. G. McMeen. (4) Dec.
Press Button Electric Lift.* (12) Dec. 30.
The Automatic v. the Manual Telephone Exchange. Kempster B. Miller. (Abstract of Paper read before the International Elec. Cong.) (26) Dec. 30.
The Uncertainty of Fuses. (26) Dec. 30.
A Method of Designing Induction Motors.* H. M. Hobart. (Abstract of Paper read before the International Elec. Cong.) (26) Dec. 30.
High-Frequency Telephone Circuit Tests. A. E. Kennelly. (Abstract of Paper read before the International Elec. Cong.) (26) Dec. 30.
A Multiple-Dial Potentiometer.* Albert Campbell. (26) Dec. 30.

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Automatic Telephony.* (11) Jan. 6.
Standard Form of Tender for Cables. (73) Jan. 6.
Recent Developments in Self-Excited Compounded Alternators.* Alexander Heyland. (Abstract of Paper read before the International Elec. Cong.) (73) Jan. 6.
A Direct Measurement of the Thomson Thermoelectric Coefficient in Soft Iron. Edwin H. Hall. (Abstract of Paper read before the Amer. Assoc. for the Advancement of Science.) (27) Jan. 7.
The Transmission of Electrical Energy Without Wires as a Means for Furthering Peace. Nikola Tesla. (27) Jan. 7.
The Electrical Testing Laboratories.* Clayton H. Sharp. (27) Serial beginning Jan. 7.
4 000-kw. Generators for the California Gas & Electric Corporation.* (27) Jan. 7.
On Direct-Current Balancers.* A. E. Kennelly and S. E. Whiting. (27) Jan. 7.
The Tuning of Thermoelectric Receivers for Electric Waves.* A. D. Cole. (27) Jan. 7.
The Ratio between Electrical and Gravitational Forces. Bergen Davis. (Paper read before the Amer. Assoc. for the Advancement of Science.) (27) Jan. 7.
Inter-Pole Variable Speed Motor.* (27) Jan. 7; (40) Jan. 27; (17) Jan. 28.
Special I. T. E. Circuit-Breaker.* (27) Jan. 7.
160 000-Volt Testing Transformer.* J. J. Frank. (27) Jan. 7.
Roller Direct-Reading Bend Tester.* (27) Jan. 7.
Canadian Niagara Power To-Day.* (27) Jan. 7.
Direct Wheatstone Working Between England & Teheran.* T. W. Stratford-Andrews. (73) Jan. 13.
Discriminating Relays and Cut-Outs.* M. B. Field. (26) Jan. 13.
The Diesel Engine in Electricity Generating Stations. A. J. Lawson. (73) Jan. 13.
Mercury Tubes in a Newspaper Pressroom.* (27) Jan. 14.
Commutation at Starting of Alternating-Current Motors with Commutator. Marius Latour. (27) Jan. 14.
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Wireless Telegraphy and War Correspondence.* Lionel James. (29) Jan. 20.
The Electrical Equipment of a London Hospital.* (26) Jan. 20.
The Sullivan Outgoing Signal Recorder.* (26) Jan. 20; (73) Jan. 20.
The Fisher-Street Sub-Station of the Metropolitan Electric Supply Co.* (73) Jan. 20.
A New American System of Wireless Telegraphy.* A. Frederick Collins. (27) Jan. 21.
The Electrical Equipment of the Bellevue-Stratford Hotel, Philadelphia.* (27) Jan. 21.
The Orling-Armstrong Electro-Capillary Recorder.* (19) Jan. 21.
Electrical Power from the Welland Canal.* (27) Jan. 21.
Hydro-Electric Power Plants in the Canadian Niagara District.* Cecil B. Smith. (9) Feb.
Electric-Power Supply from Central Stations in Great Britain.* G. L. Addenbrooke. (9) Feb.
District Electric Power Distribution.* (27) Jan. 28.
A Working Diagram of the Alternating-Current Synchronous Motor.* A. E. Kennelly. (27) Jan. 28.
The Tantalum Incandescent Lamp.* (27) Jan. 28.
Central Station Distribution. C. H. Williams. (Abstract of Paper read before the Northwestern Elec. Assoc.) (27) Jan. 28.
Novel Construction of Direct-Current Motors.* (27) Jan. 28.
Series Alternating Arc Lamps. E. P. Warner. (Abstract of Paper read before the Northwestern Elec. Assoc.) (27) Jan. 28.
Crossing Railroads by Power Transmission Lines. P. M. Lincoln. (Abstract from *Journal* of the Electric Club of Pittsburg.) (14) Jan. 28.
Tests of Auxiliaries at the Cambridge Electric Light Station. Lionel S. Marks. (Abstract from the *Harvard Engineering Journal.*) (14) Jan. 28.
A Model Electric Mining Plant: The First High-Tension Transmission Plant Built in America by a Mining Company for Its Own Use.* H. A. Pharo. (10) Feb.
The Widening Use of Small Electric Motors, with Special Reference to American Practice.* F. H. Kimball. (10) Serial beginning Feb.
Breaks in Overland Telegraphic Communication Due to Storms: Some Proposed Remedies. William Maver, Jr. (10) Feb.
Special Forms of Cranes.* Joseph Horner. (10) Serial beginning Feb.
De Forest-Ives Electric Wave-Length Standard.* A. Frederick Collins. (19) Feb. 4.
The Installation of a Transmission Plant. (From *The Electric Club Journal.*) (19) Feb. 4.
Opening of the Niagara Canadian Power Company's Plant.* (46) Feb. 4.

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L'Installation Électrique de la Tissanderie Conradi et Friedmann.* Emile Guarini. (36) Dec. 25.
Le Transmetteur Kotyra.* R. Wittebolle. (36) Dec. 25.
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Abstimmung in der Drahtlosen Telegraphie. Gustav Eichorn. (82) Jan. 7.
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Das Verhalten und die Pflege des Kommutators im Betriebe.* Karl Klein. (82) Jan. 14.
Die Dampfmaschinenanlage des Drehstromwerkes der Stadt Hannover.* Gustav ter Meer. (48) Jan. 21.
Explosionsmotoren mit Einführung Verdampfender Flüssigkeiten. K. Schreber. (Paper read before the Naturforscherversammlung in Breslau.) (82) Serial beginning Jan. 21.

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Trials of the Troopship *Dufferin.* (11) Dec. 30.
Engines of H. M. S. *Black Prince.** (12) Dec. 30.
Modern Machinery and Electrical Equipment at Yarrow Yards in England.* Frank C. Perkins. (41) Jan.
Machinery of the Italian Battleship *Regina Margherita.** (12) Jan. 6.
The Machinery of H. M. S. *Argyll.** (11) Jan. 13.
The Clyde and Naval Work. (12) Jan. 13.
The Salvage of Ships.* (11) Serial beginning Jan. 20.
Some Vessels of the Russian Baltic Fleet.* (12) Jan. 20.
Progress of Warships and Machinery Building in England. (12) Jan. 20.
A Twelve-Cylinder 150 B. H. P. Racing Marine Gasoline Motor.* (19) Jan. 28.
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Notice sur les Procédés à l'Air Comprimé Employés pour la Construction d'un Nouveau Bassin à Radoub dans l'Arsenal Maritime de la Carraca (près Cadix). M. Zschokke. (43) 3e Trimestre, 1904.

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Forging Machinery. Jas. H. Baker. (58) Dec.
The Garrett Re-Heating Furnace.* J. S. Trinham. (Paper read before the Staffordshire Iron and Steel Inst.) (22) Dec. 30.
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Wheel Cutting Machines. Thomas R. Shaw. (47) Serial beginning Dec. 31.
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Something About Corliss Valves.* W. H. Wakeman. (From *Graphite.*) (41) Jan.
A Model Sand-Brick Plant. H. O. Duerr. (Abstract of Paper read before the National Assoc. of Mfrs. of Sand-Lime Products.) (76) Jan.
Drying of Sand. P. L. Simpson. (Abstract of Paper read before the National Assoc. of Mfrs. of Sand-Lime Products.) (76) Jan.
Methods of Manufacture.* S. V. Peppel. (Abstract of Paper read before the National Assoc. of Mfrs. of Sand-Lime Products.)* (76) Jan.
An Electrical Car Installation for the Chicago Brick Co.* (76) Jan.
Generation of Steam by Waste Heat from Water-Gas Plant.* (Two Papers read before the Amer. Gaslight Assoc.) (66) Jan. 3.
Distillation of Coal by Means of Highly-Heated Gas. (66) Jan. 3.
The Flow of Gas Through Passages in Gas Apparatus, Openings in Plates, Valves, etc. F. Southwell-Cripps, Assoc. M. Inst. C. E. (66) Jan. 3.
Conway Corporation Gas-Works.* (66) Jan. 3.
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New Electrical Ignition for Petrol Motor-Cars.* (26) Jan. 6.
Practical Data on European Practice with Steam Turbines.* Franz Koester. (14) Jan. 7.
An Improved Engine-Lathe with Quick-Change Feed Device.* (17) Jan. 7.
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Reversible Internal-Combustion Engine.* (47) Jan. 7.
Fan and Blower Tests.* H. E. Field. (Paper presented before the Pittsburg Foundrymen's Assoc.) (47) Jan. 7.
Notes on Power Production.* William McClellan. (24) Jan. 9.

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The Naphthaline Question at the Bradford Meeting of the Yorkshire Junior Gas Association.* (From *Journal of Gas Lighting.*) (24) Jan. 9.
Gas Works and Gas Supply of Lausanne. (66) Jan. 10.
Direct Casting from the Blast Furnace: The Methods of Production of Cast Iron Tunnel Segments as Pursued at the Works of Thomas Butlin & Co., Limited, Wellingborough, Northamptonshire, England. (20) Jan. 12.
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Calorimetry. John F. Simmance. (11) Jan. 13.
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The Compound Steam-Turbine.* (11) Serial beginning Jan. 13.
Cylindrical Water-Tube Boiler.* (12) Jan. 13.
The Electra Steam Turbine.* Walter Rappaport. (26) Jan. 13.
Pattern Making. R. Watson. (Paper read before the Rugby Engineering Soc.) (47) Serial beginning Jan. 14.
Pressure Raising Plant at the Dover (England) Gas Works.* (From *Journal of Gas Lighting.*) (24) Jan. 16.
Carbonizing in Bulk. (From the *Gas World.*) (24) Jan. 16.
The "Helios" Die-Stock.* (66) Jan. 17.
The Trend of Gas Invention. (66) Jan. 17.
The Theory of the Incandescent Mantle. Vivian B. Lewes. (Lecture before the Junior Inst. of Engrs.) (66) Jan. 17.
Coke Handling Plant at the Rossendale Union Gas-Works.* (66) Jan. 17.
Efficiency Test of a Direct-Connected Steam Turbine Fan Blower Set.* C. R. Waller. (13) Jan. 19.
The Ess Ess Revolving Chuck.* (20) Jan. 19.
Oil as Fuel for Core Ovens.* S. F. Barnes. (Paper read before the Philadelphia Foundrymen's Assoc.) (20) Jan. 19.
The Calorific Values of Solid and Gaseous Fuels. (11) Jan. 20.
A New Type of Explosion Engine.* (12) Jan. 20.
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A Comparison of Different Types of Steam Turbine.* R. M. Neilson. (Paper read before the Manchester Assoc. of Engrs.) (47) Serial beginning Jan. 21; Abstract (12) Jan. 20.
Producer Gas from Common Bituminous Slack.* (22) Jan. 20.
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The Latest German Form of Vertical Retort Setting: Making Gas "Entirely Free from Naphthalene." (24) Jan. 23.
Notes on the Thermal Efficiency of Modern Motive-Power Engines. B. H. Thwaite. (From *Vulcan.*) (66) Jan. 24.
The Setting or Hydration of Portland Cement. Clifford Richardson. (Paper read before the Assoc. of Amer. Portland Cement Mfrs.) (13) Jan. 26.
The Prentice Vertical Drill.* (20) Jan. 26.
The International Portland Cement Works at Hull, P. Q., Canada.* John McClelland Bulkley. (14) Jan. 28.
Application of Motors to Machine Tools.* J. M. Barr. (18) Jan. 28.
An Interesting Producer-Gas Plant.* Emile Guarini. (19) Jan. 28.
Incandescent Lighting by Means of Acetylene and the Carburization of Acetylene. N. Caro. (Abstract translated from *Revue Generale de Chimie Pure et Appliquée.*) (19) Jan. 28.
A New Type of Rotary Pump.* Emile Guarini. (19) Jan. 28.
New Feed-Water Heater.* (9) Feb.
The Economy of Small-Size Coal for the Power Plant. Percival Robert Moses. (9) Feb.
Multi-Speed Motor.* (25) Feb.
Electrically Operated Lathes in Modern European and American Shops.* Frank C. Perkins. (41) Feb.
Strength and Proportion of Members to Resist a Given Moment of Force.* Frank B. Kleinhans. (41) Feb.
Lathe Attachment for Forming Concave and Convex Surfaces.* Oscar E. Perrigo. (41) Feb.
Making a Small Curtis Turbine.* H. J. Travis. (64) Feb.
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Power Required for Condensing Auxiliaries in a Steam Turbine Paint.* J. R. Bibbins. (64) Feb.
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A New Water-Tube Boiler.* (13) Feb. 2.
The Wagner Cold Saws.* (20) Feb. 2.
The Interpole Variable Speed Motor.* (20) Feb. 2.
Pneumatic Tools in Foundry Practice. Charles H. Thomas. (Paper read before the Associated Foundry Foremen.) (20) Feb. 2.

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Open Feed Water Heaters in Connection with Steam Turbines.* (20) Feb. 2.
Coal and Ore Handling Plant in the Island of Elba.* (19) Feb. 4.
Application of the Gas Engine to the Locomotive and Steamship.* (19) Feb. 4.
Automobiles à Trois Essieux: Suspension Système Lindecker.* G. Espitallier. (33) Dec. 31.
La Force Motrice a l'Exposition de Saint Louis.* L. Plaud. (33) Serial beginning Jan. 14.
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Die Rauchfrage, die Beziehungen zwischen der Rauchentwicklungen und der Ausnutzung der Brennstoffe, und die Mittel und Wege zur Rauchverminderung im Feuerungsbetrieb. F. Haier. (48) Jan. 7.
Die Bemessung der Auslassteuerung der Dampfmaschinen auf Grund der Ausströmungsgesetze.* W. Schüle (82) Serial beginning Jan. 7.
Feuerungen mit Mechanischer Beschickung.* O. Herre. (82) Serial beginning Jan. 7.
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Die Graphitschmierung.* K. Lenz. (82) Serial beginning Jan. 7.
Koksöfen, Bauart Collin.* Fr. Frölich. (48) Jan. 21.
Zur Berechnung von Dampfzylindern.* Stanislaw Brokman. (82) Serial beginning Jan. 21.

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A New Development in Cowper Hot Blast Stoves.* (22) Dec. 30.
The Neuburg-Minet Electric Furnace for the Production of Iron & Steel.* Albert Neuburger and A. Minet. (68) Dec. 31.
Electrolytic Refining of Lead and the Treatment of the Slimes Resulting Therefrom at the Canadian Smelting Works at Trail, British Columbia.* Robert L. Whitehead. (45) Jan.
Cyanidation in the United States. Charles H. Fulton. (16) Jan. 5.
Metallurgical Progress in Africa and Australia. Alfred James. (16) Jan. 5.
Blast-Furnace Vertical Blowing-Engines.* (11) Jan. 6.
Shrinkage of Cast Iron. Thomas D. West. (From *Iron and Steel Magazine.*) (47) Jan. 7.
The Preparation of Fine Material for Smelting. T. J. Greenway. (16) Jan. 12.
Crushing with Rolls.* R. K. Humphrey. (16) Jan. 12.
Rolls for Uneven Angles.* William Hirst. (20) Serial beginning Jan. 12.
Stock Distribution in the Blast Furnace.* Jos. E. Raysor and John J. Porter. (20) Jan. 12.
The Last Spook of the Blast Furnace. A. D. Elbers. (62) Jan. 19.
An Investigation of the Properties of Zinc Coatings. Charles F. Burgess. (From *Electrochemical and Metallurgical Industry.*) (20) Feb. 2.
Note sur les Fours d'Essai.* Borne-Bornet. (36) Dec. 25.
Ist Es Vorteilhaft, den Hochofengebläsewind zu Trocknen? Bernhard Osann. (50) Jan.
Uber den Einfluss von Kohlenstoff, Phosphor, Mangan und Schwefel auf die Bruchfestigkeit des Martinstahls. (50) Serial beginning Jan.
Das Lochnersche Trocknungsverfahren.* O. Wedemeyer. (Paper read before the deutsche Giesseroi-Fachleute.) (50) Jan.
Amerikanische Eisenhütten.* Max Kirdorf. (48) Jan. 21.

Military.

The Investment, Siege, and Capture of Port Arthur.* Richard Barry. (46) Jan. 14.
Mines and Subterranean Torpedoes at Port Arthur.* (Tr. from *La Nature.*) (19) Jan. 21.

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Electric Winding Engine at the Tiremande Colliery.* (22) Dec. 30.
Corrugated Tubbings for Lining Colliery Shafts.* Heise. (From *Glückauf.*) (22) Dec. 30.
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The Power Plant of the De Beers Consolidated Mines, Ltd.: A Description of Steam Turbines and Electrical Apparatus at the Diamond Fields of Kimberley, South Africa.* Alpheus F. Williams. (14) Jan. 7.

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Power Coal Drill.* (16) Jan. 12.
The Belt Conveyor as an Elevator. (12) Jan. 13.
The New Williamthorpe Pit of the Hardwick Colliery Company.* (22) Jan. 13.
Sinking a Shaft by the Freezing Process.* Joosten. (From *Glückauf.*) (22) Jan. 13.
The New Asbestos Mills of Black Lake, P. Q., Canada. E. G. du Mazuel. (14) Jan. 14.
Stone Handling Plant of the Lake Shore Stone Co., Belgium, Wis.* (13) Jan. 19.
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Voyage Minier au Nord-Ouest Canadien.* J. M. Bel. (32) Nov.

Miscellaneous.

Lateral Earth Pressures and Related Phenomena.* E. P. Goodrich, Jun. Am. Soc. C. E. (54) Vol. 53.
A Phenomenal Land Slide.* D. D. Clarke. (54) Vol. 53.

Municipal.

City of Dublin Electric Lighting.* (11) Dec. 30.
The Continental Fire Service. Edwin O. Sachs. (11) Serial beginning Jan. 13.
Broken-Stone Roads. Reginald Ryves. (11) Serial beginning Jan. 20.
Removal of Snow from City Streets. Leicester Allen. (14) Jan. 21.
A Boulevard Supported on Cantilevers.* (14) Jan. 28.
Arroseuse Électrique de la Ville de Cologne.* B. Géron. (33) Jan. 7.
Recherches sur les Aciers au Vanadium.* Léon Guillet. (33) Serial beginning Jan. 7.

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Some Notes on the Creeping of Rails.* Samuel Tobias Wagner, M. Am. Soc. C. E. (54) Vol. 53.
Theory and Practice of Single Track Blocking. H. D. Emerson. (65) Dec.
The Balanced Compound: Results Obtained from Service.* Lawford H. Fry. (61) Dec.
Cylinder Clearance and Valve Events.* O. W. Young. (61) Dec.
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Smoke Prevention. Jno. Lynch. (Paper read before the Northwest Ry. Club.) (18) Jan. 7.
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Storage Batteries for Block Signal Work.* Edward L. Reynolds. (Abstract of Paper read before the Ry. Signal Assoc.) (15) Jan. 13; (18) Jan. 14; (13) Jan. 19.
A Comparative Study in Locomotive Counterbalancing. Irving G. Downs. (Paper presented before the Central Ry. Club.) (18) Jan. 14.
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A French Opinion on American Locomotives.* Daniel Bellet. (19) Jan. 14.
Teaming Yards at Railway Stations. H. J. Pfeifer. (Abstract of Paper read before the St. Louis Ry. Club.) (13) Jan. 19; (15) Jan. 20.
The Steelwork of the Lehigh Valley R. R. Shops at Sayre.* (40) Jan. 20; (18) Jan. 21; (14) Jan. 21; (20) Jan. 26; (15) Jan. 27.
Lake Shore and Michigan Southern Locomotive at St. Louis.* H. W. Hanbury, Assoc. M. Inst. C. E. (11) Jan. 20.
The Application of Electricity to Steam Roads. L. S. Cass. (Extracts from a Paper read before the Iowa Ry. Club.) (15) Jan. 20.
Mikado (2-8-2) Locomotive for the Northern Pacific.* (15) Jan. 20.
Carbonic Acid Gas for Signals. P. G. Ten Eyck. (15) Jan. 20.
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High Capacity Cars on the Great Central of England.* (15) Jan. 20.
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The Building of the Chicago, Cincinnati & Louisville and Cincinnati, Richmond and Muncie Railroads. H. L. Weber and Fred. R. Charles. (14) Jan. 21.
Tests of the New York Central Electric Locomotive.* (17) Jan. 21.
Steel Framework of the New Locomotive Repair Shops of the Lehigh Valley R. R. at Sayre, Pa.* D. C. N. Collins, M. Am. Soc. C. E. (13) Jan. 26.
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The Compressed Air Power Plants for the Pennsylvania Railroad Tunnels, New York. (14) Jan. 28; (18) Jan. 28.
Work of the P. R. R. in Planting Timber for Ties. Joseph T. Richards. (Address before the Amer. Forestry Assoc.) (18) Jan. 28.
The Power Plant of a Modern Railroad Terminal: The Terminal Railroad Association of St. Louis, Union Station.* J. R. Bibbins. (14) Jan. 28.
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New Roundhouses at Elkhart.* (25) Feb.
A Group of New Ferry Houses.* (15) Feb. 3.
Note sur les Travaux du Tunnel du Simplon.* M. Denizet. (43) 3e Trimestre, 1904.
Les Locomotives Compound en Angleterre.* Pradelle. (36) Dec. 25.
Note sur les Outils Employés aux Etats-Unis pour l'Usinage des Roues de Voitures et Wagons.* M. Oudet. (38) Jan.
Locomotive du Système Mallet, pour le Chemin de Fer de Baltimore-Ohio.* F. Barbier. (33) Jan. 14.
Die Richtige Tunnel-Kernbau-Methode.* Michael v. Könyves-Tóth. (53) Dec. 30.
Betonschwellen auf der Ulster-Delaware-Eisenbahn.* (78) Pt. 1, 1905.
Uber Elektrische Zugsbeleuchtung mit Besonderer Berücksichtigung der Österreichischen Bahnpostwagen.* Karl Wallitschek. (53) Serial beginning Jan. 6.
Die Ausstellung für das Verkehrswesen in St. Louis.* Hugo Koestler. (53) Jan. 20.

Railroad, Street.

Feebles Tramway Motors.* (26) Jan. 6.
Large Electric Car with Steel Framing.* (18) Jan. 7.
Repair Shop Practice on the Jackson & Battle Creek Third-Rail System.* (17) Jan. 7.
The Surface Car Controller: Its Performance, Inspection and Efficiency. Edward Taylor. (17) Jan. 7.
Repair Shop for Medium Size Railways.* E. W. Goss. (17) Jan. 7.
Cast-Welding on the Calumet System at Chicago.* (17) Jan. 7.
The System of the Stark Electric Railroad Company.* (17) Jan. 7.

* Illustrated.

Railroad, Street—(Continued).

Some Recent Developments in Gasoline Cars and Locomotives.* (17) Jan. 7.
The Westinghouse No. 93 Railway Motor.* (17) Jan. 7.
The Power Station of the Amsterdam-Haarlem Electric Ry.* (14) Jan. 7.
The Amsterdam-Haarlem Tramways System.* (26) Jan. 6; (73) Serial beginning Jan. 6; (11) Serial beginning Jan. 6; (17) Jan. 7.
Electric Tramways in Hong Kong.* (73) Jan. 13; (26) Jan. 13.
The Electrification of the Metropolitan Railway.* (26) Serial beginning Jan. 13.
A London Electric Railway Power House.* (27) Jan. 14.
Car-Test Recorder of the Boston Elevated Railway Company.* J. M. Ayer. (17) Jan. 14.
"Special Track Work" at the New England Street Railway Club. Victor Angerer. (17) Jan. 14; (72) Jan. 15.
Miscellaneous Equipment of the United Railroads of San Francisco.* (72) Jan. 15.
Avoidable Causes of Central Station Fires. Arthur B. Weeks. (72) Jan. 15.
The Boston Elevated Construction Car.* (72) Jan. 15.
The Electric Tramways of Amsterdam, Holland.* E. Guarini. (72) Jan. 15.
Ft. Wayne, Van Wert & Lima Traction Co.* (72) Jan. 15.
The New Terminal Station of the Indianapolis Traction & Terminal Co.* (72) Jan. 15.
Cost of Electric Railway Power Production and Transmission in the State of Indiana. Albert S. Richey. (72) Jan. 15.
Detroit, Monroe & Toledo Short Line.* (72) Jan. 15; (17) Jan. 28.
Track and Roadbed Construction and Maintenance, with Particular Reference to the Life and Chemical Preservation of Cross-Ties. Thos. B. M'Math. (Paper read before the Indiana Elec. Ry. Assoc.) (72) Jan. 15; (17) Jan. 21.
The Construction and Maintenance of Cars and Equipment. L. M. Clark. (Paper read before the Indiana Elec. Ry. Assoc.) (72) Jan. 15.
Tramway Overhead Equipment Materials. H. M. Sayers, M. I. Mech. E. (Paper read before the Tramways and Light Ry. Assoc. (73) Serial beginning Jan. 20.
The Chamonix Electric Railway.* (12) Jan. 20.
Overhead Line Appliances for Single-Phase Electric Railways.* (17) Jan. 21.
Completion of the East Boston Tunnel.* (46) Jan. 21.
The Steel-Tired Wheel in Street Railway Service.* Norman McD. Crawford. (17) Jan. 21.
Fighting Sleet on the Aurora, Elgin & Chicago Railway.* (17) Jan. 21.
An American-Built Holland Electric Railway.* (27) Jan. 21.
Local and State Assistance to Light Railways. C. Colson. (From *Bulletin* of the International Ry. Cong.) (40) Jan. 27.
The Equipment of the East Boston Tunnel.* (17) Jan. 28.
Thermit Rail-Welding at Hartford, Conn.* (17) Jan. 28.
A New Hydro-Electric Braking System.* (17) Jan. 28.
On Batteries with Reversible Boosters. C. Turnbull. (24) Serial beginning Jan. 30.
An Interesting Petrol Locomotive.* (41) Feb.
Note sur la Ligne de Tramway de Gèrardmer à Rotournemer-la Schlucht-le Honeck.* A. Moutier. (38) Jan.
Caniveaux et Prises de Courant des Tramways Électrique de Vienne (Autriche).* (33) Jan. 7.
Das Untergrundbahnsystem der Stadt New-York.* Franz Köster. (53) Jan. 20.

Sanitary.

A Recent Visit to Twenty-four British Sewage Works. M. N. Baker. (1) Dec.
Sanitary Plumbing and Our Plumbing Laws, with Suggestions for Their Revision and Simplification.* J. Pickering Putnam. (7) Dec.
Difficulty with the Ground Water Drains of a Building. (14) Jan. 7.
The Functions of Various Types of Bacteria in the Purification of Sewage, with Some Methods for Their Quantitative Determination. H. W. Clark and Stephen De M. Gage. (13) Jan. 12.
Sanitary Regulations Governing Camps in the U. S. Reclamation Service. M. O. Leighton. (13) Jan. 19.
Talbot's Air Purifier.* (22) Jan. 20.
Heating in Connection with Condensing Engines. Reginald Pelham Bolton. (Abstract of Paper presented before the Amer. Soc. of Heating and Ventilating Engrs.) (14) Jan. 21.
Sewage Disposal at Saratoga Springs, N. Y.* (14) Jan. 21.
Progress on the Reconstruction of the Sewage Disposal Works at Manchester, England. (14) Jan. 21.
The Inlet Swamp Drainage District in Illinois. A. M. Shaw. (Abstract of Paper read before the Illinois Soc. of Engrs. and Surveyors.) (13) Jan. 26.
Performance of Hot-Blast Heating Coils. (14) Jan. 28.

* Illustrated.

Sanitary—(Continued).

Vertical and Lateral Penetration of Sewage Bacteria into Chalk Soil. (13) Feb. 2.
The Sewerage and Drainage Systems of Wheaton, Ill. Wm. B. Ewing, M. Am. Soc. C. E. (Abstract of Paper read before the Illinois Soc. of Engrs. and Surveyors.) (13) Feb. 2.
Ventilateurs Industriels.* (34) Jan.

Structural.

Lateral Earth Pressures and Related Phenomena.* E. P. Goodrich, Jun. Am. Soc. C. E. (54) Vol. 53.
The Collapse of a Building during Construction.* H. de B. Parsons, M. Am. Soc. C. E. (54) Vol. 53.
The Development of Reinforced Concrete in Europe.* E. Probst. (4) Dec.
The Problem of Grain Pressure. Wilfrid Airy, M. Inst. C. E. (11) Jan. 6.
Formulas for Hips and Valleys.* O. E. Emrich. (14) Jan. 7.
The Strength of Timber Treated with Preservatives. (13) Jan. 12; (14) Jan. 14.
The Chapel of the U. S. Naval Academy, Annapolis.* (14) Jan. 14.
The Concrete-Steel Headworks of the Ontario Power Company, Niagara Falls.* (14) Jan. 14.
The Steel Framework of the Trinity Building, New York.* (14) Jan. 14.
A Large Steel-Concrete Underpinning Girder.* (14) Jan. 14.
Notes on European Reinforced Concrete Structures.* (14) Jan. 14.
Notes on Construction of Gasholder Tanks. C. Fairweather. (Abstract of Paper read before the Scottish Junior Gas Assoc.) (66) Jan. 17.
Tests of Reinforced Concrete Beams.* Theodore L. Condron. (From *Proceedings* of Amer. Soc. for Testing Materials.) (40) Jan. 20.
Waterproofing Concrete Structures.* W. H. Finley, M. Am. Soc. C. E. (Paper presented to the Cement Users' Assoc.) (14) Jan. 21; Abstract (13) Jan. 26.
Mortar Sand. J. C. Hain. (Paper read before the National Assoc. of Cement Users.) (18) Jan. 21.
The Tasmanian Blue Gum: An Ideal Timber for Harbor Building. Harold J. Shepstone. (46) Jan. 21.
How to Design a Roof Principal.* C. E. Teasdale. (Abstract of Paper read before the Manchester District Junior Gas Assoc.) (66) Jan. 24.
The Manufacture of Concrete Fence Posts. J. A. Mitchell. (Abstract of Paper read before the National Assoc. of Cement Users.) 13) Jan. 26.
The Relation of the Engineer to the Architect. Corydon T. Purdy. (Paper read before the Amer. Inst. of Archts.) (13) Jan. 26.
Determination of Chloride of Zinc. (Rept. to the Wood Preservers' Assoc.) (13) Jan. 26.
The New Works of the Fiberloid Company, at Springfield, Mass.* (14) Serial beginning Jan. 28.
Strength and Proportion of Members to Resist a Given Moment of Force.* Frank B. Kleinhans. (41) Feb.
Some Tests of Impure Sand for Concrete.* James C. Hain. (Paper read before the National Assoc. of Cement Users.) (14) Jan. 28; (13) Feb. 2.
The New Concrete Chapel of the United States Naval Academy, Annapolis.* Day Allen Wiley. (46) Feb. 4.
Le Verre Considéré comme Matériau de Construction.* J. Malette. (36) Serial beginning Dec. 25.
Procédé de Fabrication du Platre et Four à Plâtre Système L. Perin.* Louis Perin. (33) Dec. 31.
Caserne Départementale de Gendarmerie au Bourget (Seine).* E. Rivolaen. (35) Jan.
La Reconstruction de l'Hotel de Ville de Bale.* A. Bidault des Chaumes. (33) Jan. 21.
Graphische Ermittlung der Einflusslinien für die Stabspannungen in Standerfachwerk.* S. K. Drach. (53) Dec. 30.
Dach und Hauptgesims am Zacherlhof in Wien.* (78) Pt. 1, 1905.
Neue Gründungsmethoden.* (78) Pt. 1, 1905.
Die Querschnittsbestimmung von Platten und Plattenbalken aus Eisenbeton nach Wirtschaftlichen Gesichtspunkten. E. Elwitz. (78) Serial beginning Pt. 1, 1905.
Eine Biegemaschine für Verteilte Belastung.* F. Schüle. (78) Pt. 1, 1905.
Die Berechnung von Verbunddecken im Baugewerbe. G. Barkhausen. (51) Serial beginning Jan. 4.
Zu der Arbeit von A. Baikoff über den Nachweis des Freien Kalkgehaltes im Portlandzement. A. Fehlert. (80) Jan. 7.

Water Supply.

A Phenomenal Land Slide.* D. D. Clarke. (54) Vol. 53.
On Sedimentation.* Allen Hazen, M. Am. Soc. C. E. (54) Vol. 53.

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* Illustrated.

Water Supply—(Continued).

Lake Cheesman Dam and Reservoir.* Charles L. Harrison, M. Am. Soc. C. E. and Silas H. Woodard, Assoc. M. Am. Soc. C. E. (54) Vol. 53.
Filtration for Public Water Supplies, with Especial Reference to the Double Filtration Plant at Bremen, Germany.* Eugen Goetze. (54) Vol. 53.
The Water Supply of Minneapolis.* J. Frank Corbett. (1) Dec.
Measurements of Underflow Streams in Southern California.* C. S. Slichter. (4) Dec.
Design of a Steel Water Flume.* H. G. Balcom. (58) Dec.
Electrically-Driven Pumping Plant for Water Supply and Storage of Water under Pressure. J. Hutton. (Extracts from the British Assoc. of Water-Works Engrs.) (66) Jan. 3.
Small Sand Filter Plant for a Hospital at Poughkeepsle, N. Y.* (14) Jan. 7.
Turbine Pumps for Irrigation and Drainage. J. J. Brown, M. Am. Soc. M. E. (14) Jan. 7.
Test of Stirling Boiler at Maiden Creek Pumping Station, Reading Water Works. (14) Jan. 7.
The Charles River Dam and Basin at Boston and Cambridge, Mass.* J. Albert Holmes. (13) Jan. 12.
The Copper Sulphate Treatment for Algae at Middletown, N. Y. James M. Caird, Assoc. Am. Soc. C. E. (13) Jan. 12.
The Roosevelt Masonry Dam, on Salt River, Arizona.* (13) Jan. 12.
Distribution of Velocity in Stream Flow. John C. Hoyt, Assoc. M. Am. Soc. C. E. (13) Jan. 12.
Water Power Development on the Chicago Drainage Canal.* (13) Jan. 12.
Tidal Power Schemes.* (12) Serial beginning Jan. 13.
Water Purification Plant.* (12) Jan. 13.
The Water Filtration Works at Philadelphia. (14) Jan. 14.
The Concrete-Steel Headworks of the Ontario Power Company, Niagara Falls.* (14) Jan. 14.
A Novel Water Wheel.* Alfred Gradenwitz. (46) Jan. 14.
Water Supply of Lausanne. (66) Jan. 17.
Rolling Dams at Schweinfurt, Bavaria.* Emile Guarini. (13) Jan. 19.
Electrical Power from the Welland Canal.* (27) Jan. 21.
The Construction of Reservoirs. G. Mitchell. (Paper read before the Incorporated Assoc. of Mun. and County Engrs.) (66) Jan. 24.
The Water Meter Testing Equipment of the Bureau of Standards. Albert S. Merrill. (14) Jan. 28.
Hydro-Electric Power Plants in the Canadian Niagara District.* Cecil B. Smith. (9) Feb.
The Use of Salt Water for Fire Protection and Other Purposes at U. S. Navy Yards. (13) Feb. 2.
Opening of the Niagara Canadian Power Company's Plant.* (46) Feb. 4.
Foaming of the Water in a Steam Boiler and Its Eeffct. Charles H. Haswell. (46) Feb. 4.
Beiträge zur Bestimmuug der Ein- und Austrittsgrössen von Turbinenlaufrädern auf Grund Experimenteller Untersuchung.* Camerer. (82) Serial beginning Dec. 24.
Klassifikation von Turbinen.* N. Baashuus. (48) Jan. 21.

Waterways.

The Gatun Dam.* C. D. Ward, M. Am. Soc. C. E. (54) Vol. 53.
Isthmus Canal: Sea Level Versus Locks. William W. Redfield. (1) Dec.
The Modernisation of Ancient Docks.* Brysson Cunningham, Assoc. M. Inst. C. E. (11) Dec. 30.
Inland Navigable Waterways of Bengal.* (12) Dec. 30.
Earthwork of the Seattle and Lake Washington Waterway Co.* C. H. Rollins. (Paper read before the Pacific Northwest Soc. of Engrs.) (13) Jan. 12.
The London, Brighton and South Coast Railway Company's Deptford Wharf.* (11) Jan. 13.
An Interesting Powerful Steam Dredger for Harbor Work.* (46) Jan. 14.
Rolling Dams at Schweinfurt, Bavaria.* Emile Guarini. (13) Jan. 19.
The Revival of De Lesseps' Sea-Level Plan for the Panama Canal. H. L. Abbot. (9) Feb.
The Work of the Commission on the Panama Canal. C. E. Grunsky. (9) Feb.
Le Canal de Dortmund à l'Ems.* La Rivière and Bourguin. (43) 3e Trimestre, 1904.
Projet d'Ascenseur pour Bateaux à Prerau, sur le Canal du Danube à l'Oder.* (33) Jan. 7.
Le Canal des Deux-Mers. Francis Marre. (36) Serial beginning Jan. 10.
Der Internationale Wettbewerb um das Probe-Schiffshebewerk im Zuge des Donau-Oder-Kanales bei Prerau.* F. Eiselen. (51) Serial beginning Jan. 21.

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* Illustrated.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

March 1st, 1905.—The meeting was called to order at 8.35 P. M.; President Schneider in the chair; Charles Warren Hunt, Secretary, and present, also, 128 members and 24 guests.

The minutes of the Annual Meeting, January 18th, and of the meetings of February 1st and 15th, 1905, were approved as printed in the *Proceedings* for February, 1905.

The paper entitled "Technical Methods of River Improvement, as Developed on the Missouri River, by the General Government, from 1876 to 1903," by S. Waters Fox, M. Am. Soc. C. E., was read by title, and the Secretary presented written communications on the paper from Messrs. Samuel H. Yonge and H. M. Chittenden.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

Hiram Bertrand Andrews, Boston, Mass.
Bion Joseph Arnold, Chicago, Ill.
Henry Jackson Burt, Salt Lake City, Utah.
William Hobbs Chadbourn, Jr., Beaver, Pa.
Charles Robert Foran Coutlee, Ottawa, Ont., Canada.
Frank March Haines, Fort Worth, Tex.
George Fiske Hardy, New York City.
Guy Moulton, Syracuse, N. Y.
William Henry Penfield, San Francisco, Cal.
Cornelius Van Vorst Powers, New York City.
Henry Wilson Rockett, Perth, Western Australia.
Cecil Brunswick Smith, Toronto, Ont., Canada.
Frank Soulé, Berkeley, Cal.
William Franklin Strouse, Washington, D. C.

As Associate Members.

Charles Baker Burdick, Chicago, Ill.
Charles Enzian, Wilkesbarre, Pa.
Arthur Burling Foote, Grass Valley, Cal.
James Wesley Gallagher, London, England.
Lewis Tustler Haney, Brooklyn, N. Y.
Richard Willis How, Brooklyn, N. Y.
Isaac Wendell Hubbard, Philadelphia, Pa.
Thomas Courtney Moorshead, Edwardsville, Ill.
Lewis Jefferson Proctor, San Juan, Porto Rico.
Harry Howard Rankin, Pittsburg, Pa.
George Crosby Saunders, Philadelphia, Pa.
Courtland Elmore Smith, Ossining, N. Y.
Clinton Glencairn Wells, Galveston, Tex.

As Associates.

Thomas Herbert Letson, New York City.
Domingo Anthony Usina, New York City.

The Secretary announced:

The transfer of the following candidates, by the Board of Direction, on February 28th, 1905:

From Associate Member to Member.

Maurice Fritchley Brown, Boston, Mass.
Walter Reuben Marden, Albany, N. Y.
Charles Henry Nichols, New Haven, Conn.

The election of the following candidates, by the Board of Direction:

As Juniors.

On January 3d, 1905.

Ramiro Francisco Antonio Ferradas, New York City.

On January 31st, 1905.

Clyde Webster McCornack, Phœnixville, Pa.

On February 28th, 1905.

Lester Bernstein, Morgantown, W. Va.
Harry Otto Garman, West Lafayette, Ind.
Francis Fielding Longley, Watertown, N. Y.
James Caldwell Park, Watertown, N. Y.
George Edward Pellissier, Holyoke, Mass.
Carl Robert Weidner, Independence, Kans.

Adjourned.

March 15th, 1905.—The meeting was called to order at 8.30 P. M.; President Schneider in the chair; Charles Warren Hunt, Secretary; and present, also, 105 members and 16 guests.

A paper, entitled "The Compensating Works of the Lake Superior Power Company," by G. F. Stickney, Assoc. M. Am. Soc. C. E., was presented by the author and illustrated with lantern slides.

The Secretary announced the death of Richard Somers Hayes, elected Member September 6th, 1882; died March 2d, 1905.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

February 28th, 1905.—President Schneider in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Craven, Knap, Noble, Osgood, Kuichling and Webster.

It was decided to retain the seven geographical districts into which the membership of the Society is divided for the purposes of the Nominating Committee without change for the next year.

Applications were considered, and other routine business transacted.

Three Associate Members were transferred to the grade of Member, and six candidates for Junior were elected.

Adjourned.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, April 5th, 1905.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, entitled "A New Swing Bridge at Copenhagen, Denmark," by H. C. V. Möller, Esq., will be presented for discussion.

This paper is printed in this number of *Proceedings*.

Wednesday, April 19th, 1905.—8.30 P. M.—At this meeting a paper, entitled "The Reconstruction of the Baltimore and Ohio Railroad Bridge over the Ohio River, at Benwood, West Virginia," by J. E. Greiner, M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings*.

ANNUAL CONVENTION.

The Thirty-Seventh Annual Convention will be held in Cleveland, Ohio, June 20th-23d, 1905. The following Committees have been appointed to take charge of the arrangements.

COMMITTEE OF THE BOARD OF DIRECTION:

ALFRED CRAVEN, *Chairman;*

N. P. LEWIS,
W. J. WILGUS,
CHARLES S. GOWEN,
CHAS. WARREN HUNT.

LOCAL COMMITTEE:

A. MORDECAI, *Chairman;*

WM. J. CARTER,
HARRY FULLER,
E. A. HANDY,
A. M. JOHNSTON,
M. W. KINGSLEY,
J. FRANCIS LE BARON,
F. C. OSBORN,
W. P. RICE,
J. RITCHIE,
W. H. SEARLES,
S. T. WELLMAN,
C. H. WRIGHT.

PRIVILEGES OF LOCAL SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

The Boston Society of Civil Engineers will welcome any member of the American Society of Civil Engineers at its library and reading room, 517 Tremont Temple, Boston, which is open on week days from 9 A. M. to 5 P. M. Members will also be welcome at the meetings, which are held in the same building, on the evenings of the fourth Wednesday in January, and the third Wednesdays of other months, except July and August.

The rooms of **The St. Louis Engineers' Club** are in the business center of St. Louis, and visiting engineers are cordially invited to use them for mail, telephone service, information, etc.

The courtesies of **The Engineers' Society of Western Pennsylvania** have been extended to members of the American Society of Civil Engineers. The rooms of the Society, 410 Penn Ave., Pittsburg, Pa., are open at all times, and meetings are held as follows, except during July and August. REGULAR SECTION, Third Tuesdays; CHEMICAL SECTION, Thursdays following third Tuesdays; MECHANICAL SECTION, First Tuesdays; STRUCTURAL SECTION, Fourth Tuesdays.

The Western Society of Engineers, Monadnock Block, Chicago, Ill., tenders to members of this Society the use of its rooms and facilities, together with the good offices of its Secretary and of a special committee appointed for that purpose.

The Civil Engineers' Club of Cleveland, Ohio, invites members of this Society to make use of the Club rooms, at any time when in Cleveland. Cards will be furnished on application to the Secretary, Mr. J. C. Beardsley.

The Engineers' Club of Central Pennsylvania has established new quarters at the corner of Second and Walnut Streets, Harrisburg, Pa., and desires to extend the courtesies of the Club to visiting members of the American Society of Civil Engineers.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an

engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

INTERNATIONAL ENGINEERING CONGRESS PUBLICATIONS.

The first volume of the Proceedings of the International Engineering Congress is now ready for distribution to all Members elected prior to December 31st, 1904. There will be six volumes in all. Members have been notified that they would receive these volumes (issued as Parts A, B, C, D, E and F of Vol. LIV of *Transactions*) and asked whether they wished them bound in one of the Standard Bindings. A number of Members who have their Volumes bound regularly have not responded, and consequently will receive these volumes in paper covers, unless an order is received at once for their binding. It is urged that all who care to have these volumes bound, and who have not already done so, send in an order for such binding immediately.

The notation of these volumes, as Parts of one of the regular volumes of *Transactions,* was adopted for the convenience of Members, so that when all are received they will be consecutive on the shelf. It was not possible at the time to say how long it would take to collate the discussions and issue these volumes, and it was thought best to issue them as Parts of Vol. LIV.

It is now expected that at least five of these volumes, and possibly all, may be forwarded to Members prior to the date they will receive the regular Volume LIV, and this explanation is given so that the membership may understand that, for them, there will be seven Parts of Vol. LIV, and that the regular Volume whose shelf place should be first, will probably not be received until after these Engineering Congress Publications.

ACCESSIONS TO THE LIBRARY.

From February 8th to March 7th, 1905.

DONATIONS.*

FOWLER'S MECHANICAL ENGINEER'S POCKET BOOK, 1905.

Edited by William H. Fowler. Leatherette, 6 x 4 in., illus., 78 + 498 pp. Manchester, Scientific Publishing Co. 1 shilling, 9 pence.

This edition has a new section on Entropy and its application to Steam-engine practice. Notes have also been compiled on a variety of engineering questions which are now coming into prominence, such as steam turbines, high-speed tool steel, emery grinding, milling, reaming, etc. At the same time, the whole matter has been revised, and where necessary, amended, so as to keep it, as far as possible, abreast with current practice. There is an index of nearly twenty-three pages.

LOCOMOTIVE OPERATION.

A Technical and Practical Analysis. By G. R. Henderson. Cloth, 9 x 6 in., illus., 7 + 528 pp. Chicago, *Railway Age*, 1904. $3.50.

The author states, that the object of this work is a complete and systematic discussion of the theory and practice of locomotive operation, that is, the work or results accomplished by a locomotive in motion, together with the effect upon itself and the track, and the amount of fuel and water needed to perform such work, rather than an exclusive treatise upon the mere manipulation of the machine, though the latter naturally forms a part of the study, in connection with the proper manner of procuring certain results. Inertia is first considered; the Action of Steam is next examined in detail, as to the power of producing rotation and strains in the various members of the mechanism; Resistance follows, and then Slipping and Braking; Steam Capacity; Hauling Capacity; Water and Fuel Consumption. It has been the author's endeavor to discuss, in a technical and practical manner, the various laws of mechanics which govern the subject. Numerous elementary formulæ have been presented and tables and diagrams freely introduced. There is an index of eleven pages.

ELEMENTS OF MECHANICS.

Forty Lessons for Beginners in Engineering. By Mansfield Merriman, M. Am. Soc. C. E. Cloth, 7 x 5 in., 172 pp. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1905. $1 net.

The preface states, that this elementary volume is an attempt to apply the best methods of applied mechanics to the development of the fundamental principles and methods of rational mechanics. To this end, constant appeals are made to experience, numerous numerical illustrations are given, many queries and problems are stated and a system of units is employed with which nearly every one is acquainted. The author says that to read this volume with interest and profit, only a knowledge of plane geometry, elementary algebra, and plane trigonometry is required. It is intended for manual-training schools, freshman classes in engineering colleges, and for young men in general who have the preparation just indicated. The contents are: Concurrent forces; Parallel forces; Center of gravity; Resistance and work; Simple machines; Gravity and motion; Inertia and rotation. The appendix contains: Answers to problems; Trigonometric functions; and an index of nearly two pages.

LES DÉCHETS INDUSTRIELS.

Récuperation-Utilisation. Par Paul Razous. Paper, 10 x 6 in., illus., 380 pp. Paris, Vve. Ch. Dunod, 1905. 12 francs, 15 centimes.

The author states, that, for the benefit of manufacturers, chemists and agriculturists, he has examined in his new work the use of scraps and wastes common at most factories; besides having an appreciable value as fuel, fodder, etc.,

*Unless otherwise specified, books in this list have been donated by the publishers.

their disposal often adds to the healthfulness of the neighborhood. The book first takes up the wastes connected with oiling, wiping and cleaning of machinery; the mode of lighting, etc. Then follows a review of the possible use of wastes obtained in a great variety of factories and the process by which the product is extracted, when the value of the article obtained is greater than the expense of the treatment.

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Die Entwickelung des Niederrheinisch-Westfälischen Steinkohlen-Bergbaues in der Zweiten Hälfte des 19 Jahrhunderts. Vol. 10-12. Wirtschaftliche Entwickelung, Teil 1-3. Berlin, Julius Springer, 1904.

SUMMARY OF ACCESSIONS.

February 8th to March 7th, 1905.

Donations (including 4 duplicates)	122
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Total	123

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Brown, Maurice Fritchley. Chf. Engr., Boston Bridge Works, 47 Winter St., Boston, Mass.	Assoc. M. M.	Mar. 4, 1903 Feb. 28, 1905
Davis, Charles Stratton. Care, The Massillon Bridge Co., Toledo, Ohio.		Feb. 1, 1905
Furman, Job Rockfield. Engr., Otis Elevator Co., 71 Broadway, New York City.	Jun. M.	July 2, 1890 Dec. 7, 1904
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Knapp, Hermann Meriwether. Contr. Mgr., Am. Bridge Co. of New York, Union Trust Bldg., Cincinnati, Ohio.	Assoc. M. M.	May 6, 1903 Jan. 31, 1905
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Nichols, Charles Henry. Cons. Engr., and Engr. of Connecticut Shell Fish Comm., 303 Exchange Bldg., New Haven, Conn.	Jun. Assoc. M. M.	May 2, 1893 May 2, 1900 Feb. 28, 1905
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Chase, Russell. Care, William Hood, Chf. Engr., S. P. Co., San Francisco, Cal.		Feb. 1, 1905
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MYERS, CHESTER JOHN. Care, Water Dept., Atlantic City, N. J. { Jun.	Oct. 1, 1901
{ Assoc. M.	Jan. 4, 1905
NEWELL, HERBERT DAMON. U. S. Geological Survey, Reclamation Service, Pendleton, Ore	Dec. 7, 1904
OSBORNE, GEORGE FREDERICK FOLGER. Lieut., Royal Engrs.; Asst. Engr., Public Works Dept. (Rys.), Govt. of India; Address, King, King & Co., Fort, Bombay, India	Dec. 7, 1904
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FOLLANSBEE, ROBERT. Care, U. S. Geological Survey, Washington, D. C	Nov. 1, 1904
HARTMAN, ALFRED HANSON. Elkton, Md	Dec. 6, 1904
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MOSS, ROBERT FAULKNER. Manila, Philippine Islands	Nov. 1, 1904
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DEATHS.

BASSELL, BURR.....Elected Member, November 4th, 1903; died February 24th, 1905.
CONSTABLE, CASIMIR.....Elected Member, June 17th, 1868; died February 6th, 1905.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(February 4th, 1905, to March 4th, 1905.)

NOTE.—*This list is published for the purpose of placing before the members of the Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal,* Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings,* Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal,* Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal,* Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions,* Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly,* Columbia Univ., New York City, 50c.
(7) *Technology Quarterly,* Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator,* Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine,* New York City, 25c.
(10) *Cassier's Magazine,* New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News,* New York City, 15c.
(14) *The Engineering Record,* New York City, 12c.
(15) *Railroad Gazette,* New York City, 10c.
(16) *Engineering and Mining Journal,* New York City, 15c.
(17) *Street Railway Journal,* New York City, 35c.
(18) *Railway and Engineering Review,* Chicago, Ill., 10c.
(19) *Scientific American Supplement,* New York City, 10c.
(20) *Iron Age,* New York City, 10c.
(21) *Railway Engineer,* London, England, 25c.
(22) *Iron and Coal Trades Review,* London, England, 25c.
(23) *Bulletin,* American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal,* New York City, 10c.
(25) *American Engineer,* New York City, 20c.
(26) *Electrical Review,* London, England.
(27) *Electrical World and Engineer,* New York City, 10c.
(28) *Journal,* New England Water-Works Assoc., Boston, $1.
(29) *Journal,* Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique,* Brussels, Belgium.
(31) *Annales de l'Assoc. des Ing. Sortis des Ecole Speciales de Gand.* Brussels, Belgium.
(32) *Memoires et Compte Rendu des Travaux,* Soc. Ing. Civ. de France, Paris, France.
(33) *Le Genie Civil,* Paris, France.
(34) *Portefouille Economique des Machines,* Paris, France.
(35) *Nouvelles Annales de la Construction,* Paris, France.
(36) *La Revue Technique,* Paris, France.
(37) *Review de Mecanique,* Paris, France.
(38) *Revue Generale des Chemins de Fer et des Tramways,* Paris, France.
(39) *Railway Master Mechanic,* Chicago, Ill., 10c.
(40) *Railway Age,* Chicago, Ill., 10c.
(41) *Modern Machinery,* Chicago, Ill., 10c.
(42) *Transactions,* Am. Inst. Elect. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussees,* Paris, France.
(44) *Journal,* Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals,* Scranton, Pa., 20c.
(46) *Scientific American,* New York City, 8c.
(47) *Mechanical Engineer,* Manchester, England.
(48) *Zeitschrift,* Verein Deutscher Ingenieure, Berlin, Germany.
(49) *Zeitschrift für Bauwesen,* Berlin, Germany.
(50) *Stahl und Eisen,* Düsseldorf, Germany.
(51) *Deutsche Bauzeitung,* Berlin, Germany.
(52) *Rigasche Industrie-Zeitung,* Riga, Russia.
(53) *Zeitschrift,* Oesterreichischer Ingenieur und Architekten Verein, Vienna, Austria.
(54) *Transactions,* Am. Soc. C. E., New York City, $5.

(55) *Transactions,* Am. Soc. M. E., New York City, $10.
(56) *Transactions,* Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian,* London, England.
(58) *Proceedings,* Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions,* Mining Inst. of Scotland, London and Newcastle-upon-Tyne, England.
(60) *Municipal Engineering,* Indianapolis, Ind., 25c.
(61) *Proceedings,* Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World,* 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings,* Inst. C. E. London, England.
(64) *Power,* New York City, 20c.
(65) *Official Proceedings,* New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting,* London, England, 15c.
(67) *Cement and Engineering News,* Chicago, Ill., 25c.
(68) *Mining Journal,* London, England.
(69) *Mill Owners,* New York City, 10c.
(70) *Engineering Review,* New York City, 10c.
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(73) *Electrician,* London, England, 18c.
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(77) *Journal,* Inst. Elec. Engrs., London, England.
(78) *Beton und Eisen,* Vienna, Austria.
(79) *Forscherarbeiten,* Vienna, Austria.
(80) *Tonindustrie-Zeitung,* Berlin, Germany.
(81) *Zeitschrift fur Architektur und Ingenieurwesen,* Wiesbaden, Germany.
(82) *Dinglers Polytechnisches Journal,* Berlin, Germany.

LIST OF ARTICLES.

Bridge.

Economy in Skew Bridges.* (21) Feb.
The New Spans of the Portage Viaduct, Erie R. R.: Description of the Third Bridge Bearing This Name.* (14) Feb. 4.
An Improved Detail for Lateral Connections.* (14) Feb. 11.
The Moline Bridge.* (14) Feb. 11.
The Computation of Stresses in the Blackwell's Island Bridge.* R. C. Strachan. (Paper read before the Brooklyn Engineers' Club.) (13) Feb. 16.
Concrete Floors for Railway Bridges.* (13) Feb. 16.
A Three-Hinged Concrete Steel Arch.* L. A. Keith. (14) Feb. 18.
The World's Largest Concrete-Steel Arch Bridge: The Gruenwald Bridge at Munich.* (13) Feb. 23.
Missouri River Bridge of the Omaha Bridge & Terminal Railway Company.* (15) Feb. 24.
The Erection of the Blackwell's Island Bridge.* (14) Serial beginning Mar. 4.
The Erection of the Missouri River Bridge at Plattsmouth, Neb.* F. T. Darrow. (14) Mar. 4.
The Reconstruction of the Portage Viaduct: An Explanation of the Method of Reconstruction Without Interrupting Traffic.* (14) Mar. 4.
Reconstructing Piers of a Railroad Bridge in Service.* (14) Mar. 4.
Construction of the Thebes Bridge Piers.* (14) Mar. 4.
Reinforced Concrete Piers of the Gilbertsville Bridge.* (14) Mar. 4.
The Erection of the Quebec Bridge: Building the Longest Span Bridge Undertaken in Any Country.* (14) Mar. 4.
The Viaduct of Fades.* Emile Guarini. (19) Mar. 4.
Notice sur le Pont Suspendu de Bonny-Beaulieu sur la Soire. M. Renardier. (43) 4e Trimestre. 1904.
Pont Suspendu du Bonhomme sur le Blavet (Morbihan).* G. Leinekugel Le Cocq. (33) Serial beginning Feb. 4.
La Suppression du Bois dans les Tabliers des Ponts Suspendus Modernes.* G. Leinekugel Le Cocq. (33) Feb. 18.
Versuche mit Gitterträgern.* Selinger. (78) Pt. 1, 1905.
Strassenbrücke in Eisenbeton über das Aischtal bei Neustadt a. Aisch.* Luft. (51) Feb. 15.

Electrical.

A Method for Determining Rates and Prices for Electric Power.* Frank B. Perry, Jun. M. Am. Soc. M. E. (55) Vol. 25.
Electric Drive.* E. L. Walker. (2) Jan.
The Retardation Method of Measuring Losses in Electric Motors and Generators.* Frederick W. Seringhaus, Jr., and Gerard B. Werner. (6) Jan.
The Telegraphone. Z. B. Babbitt. (3) Jan.
The Nernst Lamp.* E. R. Roberts. (58) Jan.
Null Wattmeter Methods of Measuring Power.* Albert Campbell. (26) Jan. 27.

* Illustrated.

Electrical—(Continued).

Variable Speed Motors.* C. L. Sumpter. (26) Jan. 27.
The Tantalum Lamp.* W. von Bolton and O. Feuerlein. (Paper read before the Elektrotechnischer Verein.) (73) Jan. 27; Abstract (26) Jan. 27.
The Insulation of Armature or Other Coils for High-Tension Apparatus. J. S. Highfield. (73) Jan. 27; (26) Jan. 27.
The London Coliseum (and Its Electrical Equipment). (73) Jan. 27.
The Wagner Single-Phase Motor.* (11) Jan. 27.
Automatic Voltage Regulators.* (73) Jan. 27.
The Ionic Theory of the Arc and Spark.* Henry Crew. (4) Feb.
Electric Rectifiers.* (12) Feb. 3.
Colchester Electricity Supply and Electric Tramways.* (26) Feb. 3.
Discriminating Relays and Cut-Outs: a Reply to Mr. M. B. Field. Leonard Andrews. (26) Feb. 3.
Power Plants in Parallel.* R. F. Hayward. (Abstract of Paper read before the St. Louis International Elec. Cong.) (73) Feb. 3.
Development of the Pollak-Virag Writing Telegraph. (73) Feb. 3.
The Turbine Power Station of the Terre Haute Traction & Light Co.* (14) Feb. 4.
A Canadian Municipal Telephone Plant. (27) Feb. 4.
The Stanley Rotated Jewel Bearing Wattmeter.* (27) Feb. 4.
The Use of Sensitive Quadrant Electrometers.* J. C. McLennan. (Abstract of Paper contributed to the Amer. Assoc. for the Advancement of Science.) (27) Feb. 4.
Central Station Work in Detroit.* (27) Serial beginning Feb. 4.
Central Station Distribution. C. H. Williams. (Abstract of Paper read before the Northwestern Elec. Assoc.) (24) Feb. 6.
The New Lundell Electric Motor.* (20) Feb. 9; (17) Feb. 11; (72) Feb. 15.
100-Ton Ladle Crane.* (12) Feb. 10.
Some Tests Conducted with an Electrolytic Rectifier and Motor-Generator.* Horace Boot, M. Inst. E. E. (26) Feb. 10.
Electrical Installations of the Natal Government Railways, South Africa.* (26) Feb. 10.
Electrical Development at Niagara Falls, Canada. Orrin E. Dunlap. (26) Feb. 10.
The Influence of "Load-Factor" on the Cost of Electrical Energy. Edmund L. Hill. (73) Feb. 10.
The Steam Turbo-Generator Station of the Edison Electric Illuminating Co., Boston.* (14) Feb. 11.
A Recent Development in Direct-Current Motor Construction.* (17) Feb. 11.
A Gigantic Electric Shipyard Crane.* (19) Feb. 11.
Electric Overhead Traveling Jenny.* (19) Feb. 11.
Calibration of Voltmeters and Ammeters.* L. A. Freudenberger. (27) Feb. 11.
Paralleling a 5 500-KW Turbo-Alternator. (From the *Electric Club Journal.*) (27) Feb. 11.
The Electrical Equipment of the Hotel Astor, New York.* W. E. Crane. (27) Feb. 11.
A Norwegian Hydro-Electric Plant.* (27) Feb. 11.
Jandus Series Alternating Arc Lighting System.* (27) Feb. 11.
New Office Building Plant in Boston. (27) Feb. 11.
Fog Dispersion by Electricity.* (46) Feb. 11.
Trees as Antennæ in Wireless Telegraphy.* A. Frederick Collins. (46) Feb. 11.
A Study for a Central Power and Heating Plant at Washington. (14) Feb. 11. (27) Feb. 25.
The Successful Joint Utilization of Several Small Water Powers. W. B. Jackson. (24) Feb. 13.
"Composite" Telephone Lines. (15) Feb. 17.
Motor-Starting Panels with Circuit-Breakers.* (15) Feb. 17.
Electric Plant of the Nilgiri Cordite Factory.* (26) Feb. 17.
The Dacca Electric Light Trust.* R. Stanley Smith. (26) Feb. 17.
The Conversion of a Telephone Exchange from the Magnets to the Central Battery System.* B. S. Cohen. (26) Serial beginning Feb. 17.
Modern Overhead Transmission Lines.* G. Semenza. (Abstract of Paper read before the Assoz. Elettro. Ital. tr. by John R. Dick.) (73) Feb. 17.
Economies Obtainable by Various Uses of Steam in a Combined Power and Heating Plant. (14) Feb. 18.
The Schloemilch Wave Detector.* (19) Feb. 18.
A British Switchgear for Sub-Station Control.* (27) Feb. 18.
Cross-Connection of Series Motors.* D. Kos. (From *Der Ingenieur.*) (27) Feb. 18.
The Choice of Signs in Wattmeter Problems.* L. A. Freudenberger. (27) Feb. 18.
Recent Improvement in Nernst Lamps.* (27) Feb. 18.
The Dutch Point Plant of the Hartford Electric Light Company.* (14) Feb. 25.
The Power Plants of the Edison Electric Company, of Los Angeles.* (14) Serial beginning Feb. 25.
The Edison Electricity Company's System in Southern California.* (27) Feb. 25.
A Practical Vector-Diagram for Induction Motors.* H. C. Specht. (27) Feb. 25.

* Illustrated.

Electrical—(Continued).

Induction Integrating Wattmeters.* (27) Feb. 25.
Transport d'Énergie Électrique à 60 000 Volts de Guanajuato (Mexique).* (33) Feb. 4.
Expression des Puissances Fournies par Deux Alternateurs en Parallèle. C. F. Guilbert. (36) Serial beginning Feb. 10.
Instructions Générales pour la Fourniture et la Réception des Machines et Transformateurs Électriques. E. Sartiaux. (36) Feb. 10.
Neuerungen auf dem Gebiete der Drahtlosen Telegraphie.* Adolf Prasch. (82) Serial beginning Feb. 4.

Marine.

Motor-Boats at the Paris Automobile Show.* (11) Jan. 27.
The Cunard Liner *Caronia.* (12) Jan. 27.
Electrical Plant at Gibraltar Dockyard. (73) Jan. 27; (26) Feb. 3.
Future of Turbine Propulsion. Hon. C. A. Parsons. (Abstract of Address before the Inst. of Marine Engrs.) (47) Jan. 28.
The New Scouts for the King's Navy.* (11) Feb. 3.
Armoured Cruisers. (12) Feb. 3.
Silley's Air-Tight Smoke-Box Door.* (11) Feb. 10.
The Cunard Steamship *Caronia.** (12) Feb. 10.
Fire Launch.* (12) Feb. 10.
Scout Cruisers for the United States Navy.* H. C. Dinger. (46) Feb. 11.
A Gigantic Electric Shipyard Crane.* (19) Feb. 11.
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High Speed Facing-Points. (11) Jan. 27.
The Mechanical Action of Wheel-Block Car Brakes. Robert H. Smith. (12) Jan. 27.
Railway Saloon for Rhodesia.* (12) Jan. 27.
Express Locomotives on the Bavarian State Railways.* (12) Jan. 27.
Points or Switches for Railways.* (66) Jan. 31.
Private Owners' 10-ton Tank Wagons.* (21) Feb.
Rules for Automatic Signal Working (of the American Ry. Assoc.) (21) Feb.
Rolling Stock for Belgian Light Railways. (21) Feb.
Cost and Performance of Locomotives in West Australia. (21) Feb.
Brierley's Improved Fog-Signalling Apparatus.* (21) Feb.
Express Passenger Engine: Midland Great Western Railway of Ireland.* (21) Feb.
New Roundhouse of the Lake Shore & Michigan Southern Railway at Elkhart, Ind.* (39) Serial beginning Feb.
Device for Regulating the Braking Power of Cars.* (39) Feb.
New Shops of the Pere Marquette R. R. at Grand Rapids, Mich.* (39) Serial beginning Feb.
Powerful Locomotives for Goods and Mineral Traffic on the North-Eastern Railway.* (22) Feb. 3.
The Future of Railways. Philip Dawson. (26) Serial beginning Feb. 3.
Chicago Freight Transfers and Deliveries.* (40) Feb. 3.
Continuous Process for Molding and Casting Car Wheels.* (40) Feb. 3.
Ties and Tie Preservation. J. W. Kendrick. (From *Bulletin* of the International Ry. Cong.) (40) Feb. 3.
New Angus Shops, Canadian Pacific Ry.* (18) Serial beginning Feb. 4.
Progress of Construction on the Denver Northwestern & Pacific Ry.* (18) Feb. 4.
Features of Roundhouse Construction. Leslie E. Merrill. (Abstract of Paper read before the New England R. R. Club.) (18) Feb. 4.
The Application of Electricity to Steam Railroads. Bion J. Arnold. (Extracts from Address before the International Elec. Cong.) (47) Feb. 4.
Cole's Superheater for Locomotive Boilers.* (47) Feb. 4.
Reinforced Concrete Roundhouse for the Canadian Pacific Ry., at Moose Jaw, Canada.* (13) Feb. 9.
Advantages of Four-Cylinder Balanced Compound Locomotives.* (From *Record of Recent Construction, No.* 49, Pub. by the Baldwin Locomotive Works.) (15) Feb. 10.
Shop Notes.* (15) Feb. 10.
Proposed Specifications for Cast-Iron Wheels. C. W. Gennet, Jr. (15) Feb. 10.
The Campbell Concrete Tie.* (15) Feb. 10; (62) Feb. 23.
San Pedro Los Angeles & Salt Lake Railroad.* (40) Feb. 10.
The Scrap Yard of the Great Northern Railway.* W. G. Tubby. (Abstract of Paper read before the Northwest Ry. Club.) (40) Feb. 10.
New Locomotives for the Chicago & Western Indiana.* (40) Feb. 10.
Tank Engines on Express Trains. Charles Rous-Marten. (12) Feb. 10.
Cudworth Railway Accident. (12) Feb. 10.
Electrical Installations of the Natal Government Railways, South Africa.* (26) Feb. 10.
Construction of Foundations for the Yonkers Power House of the New York Central R. R.* (14) Feb. 11.
Rotary Snow Plow, D., N. W. & P. Ry.* (18) Feb. 11.
Pacific Water Powers for Electric Railroads. Robert McF. Doble. (Abstract of Paper read before the Pacific Coast Ry. Club.) (20) Feb. 9; (27) Feb. 11.
Third Rail Bonds on the Long Island R. R.* (72) Feb. 15.
Tank Locomotives for Suburban Service on American Railways.* (13) Feb. 16.
Proposed Passenger Terminal System for Chicago.* (13) Feb. 16.
The St. Mary's Park Tunnel, N. Y. C. & H. R. R. R.* (13) Feb. 16.
The Derailment on the Great Western Railway.* (12) Feb. 17.
The Cost of Locomotive Operation. G. R. Henderson. (15) Serial beginning Feb. 17.
Automatic Couplers in Europe.* G. Noltein. (Abstract of Report to be presented to the International Ry. Cong.) (15) Serial beginning Feb. 17.
Boiler Explosion on the New York Central.* Geo. L. Fowler. (15) Feb. 17.
Hayes Lifting Derail.* (15) Feb. 17.
Recording Air Brake Operations.* (40) Feb. 17.
A Recent Type of Italian Compound Express Locomotive.* (40) Feb. 17.
Chicago & Western Indiana's New Passenger Car Yard, Chicago.* (40) Feb. 17.
New System of All-Electric Interlocking.* (18) Serial beginning Feb. 18.
Six-Wheel Switcher, Southern Ry.* (18) Feb. 18.
Electrical Equipment of the New York Central Railroad. (46) Feb. 18.
Gasoline Locomotives and Cars for Railroads.* (19) Feb. 18.
Stone and Concrete Retaining Walls for Track Elevation in Chicago.* (13) Feb. 23.

* Illustrated.

Railroad—(Continued).

The Main Street Crossing of the Canadian Pacific Ry., at Winnipeg, Man.* (13) Feb. 23.
Electric Traction on the Paris & Orleans Ry. at Paris, France.* (13) Feb. 23.
Office Methods in Railway Surveys. W. D. Gerber. (Abstract of Paper read before the Illinois Soc. of Engrs. and Surveyors.) (13) Feb. 23.
Steam Motor Cars on the Great Central of England.* (15) Feb. 24.
Compressed Air Power Plants for the Pennsylvania Tunnels. (15) Feb. 24.
The Chicago & Western Indiana Power House.* (40) Feb. 24.
Automatic Couplers.* A. W. Gibbs. (From *Bulletin* of the International Ry. Cong.) (40) Feb. 24.
Prairie Type Locomotive for the Burlington.* (40) Feb. 24; (18) Feb. 25.
The Echelon Engine House.* (18) Feb. 25.
General Engineering Features of the Denver, Northwestern & Pacific Ry.* (14) Feb. 25.
Locomotive Practice on the New Zealand Government Railways.* Charles Rous-Marten. (10) Mar.
Production Improvements: Chicago Shops, C. & N. W. Railway. (25) Mar.
Six-Coupled Passenger Locomotives: 4-6-2 Type, Chicago, Milwaukee & St. Paul Railway.* (25) Mar.
Prairie Type Freight and Passenger Locomotive: Chicago, Burlington & Quincy Railway.* (25) Mar.
New Roundhouses at Elkhart: Lake Shore & Michigan Southern Railway.* (25) Mar.
Four-Cylinder Vauclain Balanced Compound Locomotive: 4-6-0 Type, 'Frisco System.* (25) Mar.
Rapid Production Vertical Turret Lathe.* (25) Mar.; (20) Mar. 2; (15) Mar. 3.
Double-Track Work on the Southern Railway between Alexandria and Orange, Va.* John W. Ash. (13) Mar. 2.
Grass and Weed Destroyer, Guayaquil & Quito Railway, Ecuador. John A. Harmon. (13) Mar. 2.
Flat Cars for the Argentine Government Railways.* (15) Mar. 3.
Cast Steel Locomotive Frames.* (15) Mar. 3.
The Valtellina Line and the Electrical Operation of Railroad Main Lines. Theodore Köhu. (Tr. from the *Organ fuer die Fortschritte des Eisenbahnwesens.*) (15) Serial beginning Mar. 3.
Southern Railway Six-Wheel Switching Engines.* (40) Mar. 3.
McElroy Automatic Axle Lighting System.* (40) Mar. 3.
Construction of the Port Morris Power House for the New York Central R. R.* (14) Mar. 4.
The Cumberland Extension of the Western Maryland R. R.: Construction of the New Link in the Eastern Part of the Gould System.* (14) Serial beginning Mar. 4.
Note sur la Comparaison de Plusieurs Lignes de Chemins de Fer, au Moyen des Longueurs Virtuelles. M. Jacquier. (43) 4e Trimestre. 1904
Projet de Tunnel Tubulaire en Béton Armé.* Ch. Dantin. (33) Jan. 28.
Locomotives Compound a Grande Vitesse et a Trois Essieux Couplés de la Compagnie Paris-Lyon-Méditerranée. Ch. Baudry. (38) Feb.
Les Nouvelles Ligues du Chemin de Fer Rhétique.* F. Rey. (38) Feb.
Étude du Chemin de Fer Électrique Triphasé a Voie Normale de Burgdorf à Thun.* Maurice Soubrier. (36) Serial beginning Feb. 10.
Die Erweiterungsanlagen der Görlitzer-Eisenbahn zwischen Berlin und Grünau.* Ernst Biedermann. (49) Pt. 1-3, 1905.
Vorschriften für Stampfbeton-Arbeiten der Kgl. Sächsischen Staatseisenbahnen. (51) Jan. 25.
Erfahrungen und Ergebnisse des Zweijährigen Elektrischen Betriebes mit Hochgespanntem Drehstrom auf der Valtellina-Bahn.* Eugen Cserhati. (48) Jan. 28.

Railroad, Street.

Rolled-Steel Car Wheels.* Samuel M. Vauclain. (3) Jan.
The Cricklewood and Edgware Tramway. (12) Jan. 27.
London Electric Railways.* Hon. Robert P. Porter. (29) Jan. 27.
The Electrification of the District Railway.* (12) Serial beginning Feb. 3.
Colchester Electricity Supply and Electric Tramways.* (26) Feb. 3.
Sub-Stations and Automatic Signalling on the District Railway.* (73) Feb. 3.
The Street and Interurban Railway Systems at Terre Haute, Indiana.* (17) Feb. 4.
Fire Inspections and Fire Precautions (of the Street Railway Company) in Hartford, Conn.* (17) Feb. 4.
Electric Tramways in Hong Kong, China.* (17) Feb. 4.
Car Storage Houses *vs.* Operating Barns.* D. F. Carver. (17) Feb. 4.
Recent Methods of Construction and Pavement of Tracks in Boston.* Arthur L. Plimpton. (17) Feb. 4.
Fuel, Ash and Gas Testing.* J. Stanley Richmond. (17) Serial beginning Feb. 4.
Overhead Equipment. H. M. Sayers, M. I. M. E. (Abstract of Paper read before the British Tramways and Light Rys. Assoc.) (17) Feb. 4.

* Illustrated.

Railroad, Street—(Continued).

The Open Feed-Water Heater. E. T. Walsh. (17) Feb. 4.
A Typical Shop Equipment for Handling Steel-Tired Wheels.* (17) Feb. 4.
A New Double Truck for Heavy Electric Cars.* (17) Feb. 4.
A Chinese Electric Railway System.* (27) Feb. 4.
The Birmingham and Midland Tramways.* (73) Feb. 10.
The New Repair Shop Plant of the Detroit United Railway.* (17) Serial beginning Feb. 11.
The Coeur D'Alene & Spokane Railway.* (17) Feb. 11.
The Power-Distribution System of the Louisville Railway Company.* (17) Feb. 11.
Steam Power (for Electric Railways). E. P. Roberts. (Paper read before the Ohio Interurban Ry. Assoc.) (17) Feb. 11; (72) Feb. 15; (14) Feb. 18.
The San Francisco Gas-Engine Electric Plant.* (17) Feb. 11.
The Iowa & Illinois Railway Co.: Describing the Line, Power Plant, Rolling Stock and Operating Methods of the Recently Completed Interurban Line between Clinton and Davenport, Iowa.* (72) Feb. 15.
Paris Metropolitan Railway Co.* M. Vingoe. (72) Feb. 15.
Cost of Electric Railway Power Production and Transmission in the State of Indiana. A. S. Richey. (Abstract of Paper read before the Indiana Elec. Ry. Assoc.) (13) Feb. 16.
An Alternating Current Trolley Line.* (15) Feb. 17.
The Conduit Lines of London and New York. J. Allen Baker. (26) Feb. 17; (73) Feb. 17; (11) Feb. 17.
Tramways *v.* Motor 'Buses. Henry M. Sayers. (73) Feb. 17.
A Power Plant With 5 000 H.-P. Gas Engines.* (14) Feb. 18.
A Concrete Subway Roof Arch with Reinforced Ribs.* (14) Feb. 18.
Opening of the Indianapolis & Cincinnati Single-Phase Line.* (72) Feb. 15; (40) Feb. 17; (17) Feb. 18; (18) Feb. 18; (14) Feb. 18; (27) Feb. 18.
The Tokio Tramway Company.* E. A. Baldwin. (17) Feb. 18.
Thermit Rail Welding in Holyoke.* (17) Feb. 18.
The New Steam Turbine Plant of the Public Service Corporation.* (17) Feb. 18.
The East Boston Tunnel.* (20) Feb. 23.
The Chamouix Electric Railway.* Emile Guarini. (15) Feb. 24.
The Chelsea Generating Station of the London Underground Railways.* (14) Feb. 25.
The Subway of the Philadelphia Rapid Transit Co.* (14) Feb. 25.
The New Interurban Line of the Lansing & Suburban Traction Company.* I. L. Dixon. (17) Feb. 25.
A New Shifting Locomotive for the Brooklyn Rapid Transit Company.* (17) Feb. 25.
The Solid Forged and Rolled Steel Wheel for Street Railway Service.* (17) Feb. 25.
Laying Street Railway Tracks in Cincinnati: Specifications for Bitulithic Pavement. J. M. Harper. (Abstract of Paper read before the Ohio Eng. Soc.) (13) Mar. 2.
New Steel Cars for the Metropolitan West Side Elevated Railroad, Chicago.* (40) Mar. 3.
Track Laying on the Williamsburg Bridge.* (14) Mar. 4.
Freinage des Tramways par l'Air Comprimé.* (33) Feb. 11.
Chemins de Fer Électriques de la Valteline; Résultats de Deux Ans d'Exploitation.* (33) Feb. 11.
Éclairage Électrique des Trains, Système Aichelè.* (33) Feb. 18.

Sanitary.

Refuse Destruction by Burning, and the Utilization of Heat Generated.* C. Newton Russell, M. Inst. M. E. (55) Vol. 25.
The Burning of Town Refuse, with Special Reference to the Destructors at Brussels, West Hartlepool, Moss Side, and Westminster. George Watson Leeds, M. Inst. M. E. (55) Vol. 25.
The Bacterial Disposal of Sewage. G. Everett Hill. (3) Jan.
Refuse Destruction and Steam Production. (12) Jan. 27.
The Nelson Refuse Destructor (Report on Tests by the Manchester Steam Users' Assoc.). (11) Jan. 27; (26) Feb. 3.
Sanitary Betterment in Large Industrial Plants.* Severance Burrage. (4) Feb.
Construction of Part of the Intercepting Sewers of Chicago.* W. A. Shaw and Guy Miltimore. (4) Feb.
Tools for Cleaning Sewers.* (60) Feb.
Tile Drainage in Iowa. A. Marston. (Paper presented before the Iowa Brick & Tile Assoc.) (76) Feb.
Combined Chemical and Bacterial Sewage Treatment, Withington, England. (14) Feb. 4.
The Pasadena, Cal., Sewer Farm.* T. D. Allin. (14) Feb. 11.
The Mechanical Plant (Including Ventilating and Heating) of Simmons College, Boston.* K. S. Howard. (14) Feb. 11.
Extent of Infiltration through Perforations in Manhole Covers.* Alexander Potter, Assoc. M. Am. Soc. C. E. (14) Feb. 11.
A Study for a Central Power and Heating Plant at Washington. (14) Feb. 11; (27) Feb. 25.

* Illustrated.

Sanitary—(Continued).

Some Phases of Sewage Disposal. E. A. Barbour, M. Am. Soc. C. E. (Extracts from Paper read before the Ohio Soc. of Engrs.) (14) Feb. 18.
Air Purification in the Ventilating Plant of the City Hall, St. Louis.* (14) Feb. 18.
Economies Obtainable by Various Uses of Steam in a Combined Power and Heating Plant. (14) Feb. 18.
Proposed Crematory for Street Sweepings and Light Refuse, New York City.* (13) Mar. 2.

Structural.

The Influence of Carbon, Phosphorus, Manganese and Sulphur on the Tensile Strength of Open-Hearth Steel.* H. H. Campbell. (71) Vol. 66.
New Data on the Weight of a Crowd of People.* Lewis J. Johnson. (1) Jan.
The Fremont Method of Determining the Fragility of Iron and Steel.* Thorsten Y. Olsen. (2) Jan.
Note on the Summation of Stresses in Certain Structures.* Carl Hering. (2) Jan.
Re-enforced Concrete. Robert A. Cummings. (58) Jan.
A Comparison of Reinforced Concrete Formulas.* L. D. Cornish. (58) Jan.
Wood Mill Building Construction as Exemplified by the Plant of the Sligo Iron and Steel Co. of Connellsville, Pa. A. E. Duckham. (58) Jan.
Reinforced Concrete. C. A. P. Turner, M. Am. Soc. C. E. (Paper read before the Northwest Concrete Products Convention.) (67) Jan.
The Waterproofing of Concrete Blocks. G. B. Kirwan. (Paper read before the National Assoc. of Cement Users.) (60) Feb.
Water Proofing Concrete Structures. W. H. Finley. (Paper read before the National Assoc. of Cement Users.) (60) Feb.
Cement Posts. J. A. Mitchell. (Paper read before the National Assoc. of Cement Users.) (60) Feb.
Report of Committee on the Materials of Construction (Presented to the Indiana Eng. Soc.). (60) Feb.
Testing of Cement Blocks. John R. Allen. (Paper read before the National Assoc. of Cement Users.) (60) Feb.
The Testing of Clay. Edward Orton, Jr. (Paper read before the National Brick Manufacturers' Assoc.) (76) Feb.
The Survival of the Fittest, Brick Tried by Fire and not Found Wanting. Albert D. Klein. (Paper read before the National Brick Manufacturers' Assoc.). (76) Feb.
A Reinforced-Concrete Machine Shop in Philadelphia.* (14) Feb. 4.
An Analysis of Concrete-Steel Construction.* F. C. Slade. (24) Feb. 6.
The Adjusted Fire Losses on the Fireproof Buildings at Baltimore, Md. (Report of the Baltimore Com. of the National Board of Fire Underwriters.) (13) Feb. 9.
Test of a Reinforced Concrete Floor.* (15) Feb. 10.
How to Design a Roof Principal.* C. E. Teasdale. (Abstract of Paper read before the Manchester District Junior Gas Assoc.) (24) Feb. 13.
Alternating Stress Testing-Machine at the National Physical Laboratory.* T. E. Stanton. (11) Feb. 17.
The Diamond Bank Building, Pittsburg.* (14) Feb. 18.
The Rapid Construction of the Baltimore-American Building.* (14) Feb. 18.
Planning a Modern Race Track: Belmont Park, at Queens, L. I.* (13) Feb. 23.
Test of a New System of Terra-Cotta Floors.* (14) Feb. 25.
Aims and Scope of Laboratory Tests of Reinforced Concrete. F. H. Constant. (60) Mar.
British Standard Specifications for Portland Cement.* (13) Mar. 2.
Visintini Reinforced Concrete Construction, Textile Machine Works, Reading, Pa.* Leon S. Moisseiff, Assoc. M. Am. Soc. C. E. (13) Mar. 2.
Safeguards for Laying Concrete in Frosty Weather.* (14) Mar. 4.
The Construction of the Steel-Concrete Shops at Beverly, Mass: Buildings for the New Plant of the United Shoe Machinery Co.* (14) Mar. 4.
Concrete Piles at the United States Naval Academy.* Walter R. Harper. (14) Mar. 4.
The Robert Gair Reinforced-Concrete Factory and Warehouse.* (14) Mar. 4.
De l'Utilité des Barres de Compression dans les Dalles, Poutres et Combinaisons de Dalles et de Poutres, Soumises à la Flexion. N. de Tedesco. (78) Serial beginning Pt. 1, 1905.
Schornsteinbauten aus Armiertem Beton in Nordamerika.* E. Probst. (78) Pt. 1, 1905.
Der Wasserturm in Forest (Belgien).* O. Amiras. (78) Pt. 2, 1905.
Sandfestigkeit der Zemente. (80) Jan. 28.
Ueber das Zementmahlen. Ferd. M. Meyer. (80) Feb. 4.
Neue Studien und Versuche über die Tragkraft der Säulen und den Einfluss der Einspannung an den Enden.* Bernhard Kirsch. (53) Feb. 17.
Beitrag Zur Bestimmung der Biegungsspannung in Gekrümmten Stabförmigen Körpern.* Ernst Werner. (48) Feb. 18.
Der Neue Dom zu Berlin.* (51) Serial beginning Feb. 18.
Ein Kohlensilo in Eisenbeton.* (51) Jan. 25.

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Topographical.

Hornstein's Tacheometer.* (11) Feb. 10.
Photographic Methods on the Canadian Topographical Survey.* (14) Feb. 18.
A Special Theodolite for Tunnel Cross-Sections and General Tachymetry.* (13) Mar. 2.

Water Supply.

The Pitot Tube.* W. B. Gregory, M. Am. Soc. M. E. (55) Vol 25.
Some Applications of Wooden Stave Pipe.* John Birkinbine. (2) Jan.
Drilling Wells in Soft and Unconsolidated Formations.* I. N. Knapp. (8) Jan.
The Coolgardie Water Scheme. (66) Jan. 31.
The Water Filtration Plant of the Kolar Gold Field at Mysore, India.* Edmund B. Weston, M. Am. Soc. C. E., M. Inst. C. E. (60) Feb.
Progress in the Filtration of Public Water Supplies. Charles Brossmann, Jr. (From a Paper read before the Indiana Eng. Soc.) (60) Feb.
The New Well and Hydraulic Pumping Plant at Peoria, Ill.* Dabney H. Maury. (Paper read before the Illinois Soc. of Engrs. and Surveyors.) (14) Feb. 4.
The Revised Plans for the Purification of the Pittsburg Water Supply.* (14) Feb. 4.
The Water Filtration Works at Anderson, Ind.* F. B. Leonard. (14) Feb. 4.
The Parabolic Method of Computing Stream Gagings. F. W. Hanna. (13) Feb. 9.
A Concrete Dam on a Pile Foundation at St. John's Lake, Long Island, New York.* (13) Feb. 9.
A Quickly Erected Reinforced Concrete Dam at Felelon Falls, Ont.* (13) Feb. 9.
Copper Sulphate and Copper Foil or Copper Vessels for the Treatment of Typhoid-Infected Water. (13) Feb. 9.
The Laguna Dam, Yuma Irrigation Project, California.* (13) Feb. 9.
Pacific Water Powers for Electric Railroads. Robert McF. Doble. (Abstract of Paper read before the Pacific Coast Ry. Club.) (20) Feb. 9; (27) Feb. 11; (14) Feb. 18.
Electrical Development at Niagara Falls, Canada. Orrin E. Dunlap. (26) Feb. 10.
A New Form of Filter Gallery at Nancy, France.* E. A. Gieseler. (14) Feb. 11
A Norwegian Hydro-Electric Plant.* (27) Feb. 11.
The Successful Joint Utilization of Several Small Water Powers. W. B. Jackson. (24) Feb. 13.
The Theory of the Flow of Elastic Fluids and the Divergent Nozzle.* M. Blieden. (12) Serial beginning Feb. 17.
A Great Irrigation Project in the Punjab.* (12) Feb. 17.
A Private Irrigation System in Texas.* (14) Feb. 18.
Legal Restrictions on the Use of Underground Water Supplies in New York. (14) Feb. 18.
Calculators for the Velocity of Discharge of Fluids from Pipes.* (66) Feb. 21.
The Governing of Impulse Wheels.* Irving P. Church. (14) Feb. 25.
The Power Plants of the Edison Electric Company, of Los Angeles.* (14) Serial beginning Feb. 25.
The New Interurban Line of the Lansing & Suburban Traction Company.* I. L. Dixon. (17) Feb. 25.
Pumps.* Philip R. Björling. (From *Public Works.*) (19) Feb. 25.
Cost of Laying a 12-in. Water Pipe across a River. (13) Mar. 2.
Gravity Tunnel for the New Water-Works of Cincinnati.* J. A. Hiller, Assoc. M. Am. Soc. C. E. (14) Mar. 4.
Construction of the Schuylerville Concrete Dam and Power House.* (14) Mar. 4.
Completing the New Croton Dam.* (14) Mar. 4.
Les Services d'Eaux et d'Assainissement dans Quelques Villes Allemandes Pierre Jolibois. (36) Jan. 25.
Le Jaugeage de l'Eau.* N. de Tedesco. (36) Feb. 10.
Der Wasserturm in Forest (Belgien).* O. Amiras. (78) Pt. 2, 1905.

Waterways.

Middlesborough Dock Electric and Hydraulic Power Plant.* Vincent L. Raven, M. Inst. M. E. (55) Vol. 25.
A Menace to the New York Harbor Entrance. Lewis M. Haupt. (3) Jan.
Improvements in Shipping Ports.* (22) Serial beginning Jan. 27.
The Navigation of the Nile.* Sir William H. Preece. (29) Feb. 3.
The Calumet Drainage Canal. (13) Feb. 9.
The Improvement of the Port of Manzanillo, Mexico.* (13) Feb. 16.
Report of the Committee on Engineering of the Isthmian Canal Commission. (13) Mar. 2; (14) Mar. 4.
Note sur les Dragages Effectués au Port de Calais de 1896 à 1903. M. Bodin. (43) 4e Trimestre, 1904.
Étude sur l'Emploi du Froid Artificial pour l'Exécution des Batardeaux dans les Écluses de Navigation et pour les Fondations de Divers Ouvrages.* E. Maynard. (36) Jan. 25.
Aus den Bedingungen für den Neubau von Unratskanälen in Wien (1901). (78) Pt. 1, 1905.
Studie über die Bestimmungen der Normalprofile Geschiebeführender Gewässer.* Richard Siedek. (53) Serial beginning Feb. 3.

* Illustrated.

AMERICAN SOCIETY OF CIVIL ENGINEERS.
INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

April 5th, 1905.—The meeting was called to order at 8.40 P. M.; President Schneider in the chair; Chas. Warren Hunt, Secretary, and present, also, 94 members and 18 guests.

The minutes of the meetings of March 1st and 15th were approved as printed in the *Proceedings* for March, 1905.

A paper by H. C. V. Möller, Esq., entitled "A New Swing Bridge at Copenhagen, Denmark," was presented by the Secretary, who also presented a written communication on the paper from John C. Moses, M. Am. Soc. C. E. The subject was discussed orally by Messrs. J. A. L. Waddell, H. T. Forchhammer and E. Kuichling.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

James Aubrey Davenport, Roanoke, Va.
William Ashton Doble, San Francisco, Cal.
James Edwin Garrett, Naica, Chihuahua, Mexico.
William Edward Gunn, Covington, Ky.
Joseph Arnold Norcross, New Haven, Conn.
John Stephen Sewell, Washington, D. C.

As Associate Members.

Asher Atkinson, New Brunswick, N. J.
Arthur Horace Blanchard, Providence, R. I.
William Whitlock Brush, Brooklyn, N. Y.
Sidney Kingman Clapp, Boston, Mass.
Philip Herrick Dater, Rochester, N. Y.
Edwin Clifford Finley, St. Louis, Mo.
Frank Lawton Getman, Hudson, N. Y.
John Wesley Goodridge, New York City.
Jerome Campbell Herring, Jefferson City, Mo.
Bertram Henry Majendie Hewett, New York City.
Caleb Hyatt, New York City.
Alexander Howard Nelson, Pittsburg, Pa.
Algernon Sidney Nye, New York City.
Shelby Saufley Roberts, Elizabethtown, Ky.
Rudolf Viedt Rose, Niagara Falls, N. Y.
Robert Wilson Sayles, New York City.
Charles Depew Searle, New York City.
Henry Radclyffe St. Arvans Walters, Bethlehem, Pa.
Eitaro Watanabe, Taipeh, Formosa, Japan.
Gilbert Case White, Winston-Salem, N. C.
Clarence George Wrentmore, Ann Arbor, Mich.

As Associates.

Thomas Frank Quilty, Chicago, Ill.
Gilbert Hilton Scribner, Jr., Chicago, Ill.

The Secretary announced:

The transfer of the following candidates, by the Board of Direction, on April 4th, 1905:

From Associate Member to Member.

George Elliot Browning, Trichur, South India.
Harrison Wainwright Latta, Philadelphia, Pa.
Moses Jerome Look, Clinton, Mass.
James Cowan Meem, Brooklyn, N. Y.

Harry Johnson Morrison, Syracuse, N. Y.
John Edwin Ostrander, Amherst, Mass.
Clarence DuBois Pollock, Brooklyn, N. Y.
James Walter Rickey, Minneapolis, Minn.
George Albert Soper, New York City.
Charles Frederick Taylor, New York City.

The election of the following candidates, by the Board of Direction:

As Juniors.

On December 6th, 1904.
Alfred Hanson Hartman, Elkton, Md.

On April 5th, 1905.
Henry Avery Campbell, Coyote, Cal.
Arden Duane Doty, New York City.
Richard King Hale, Brookline, Mass.
Herbert Watson Hatton, Wilmington, Del.
Donald Winthrop Howes, New York City.
Thomas Benton Hunter, Monterey, Cal.
Walter Edward Lydston, Auburn, N. Y.
John Lorenzo McConnell, Louisville, Ky.
James Michael Owens, San Francisco, Cal.
David Joseph Shaw, New York City.
Thomas Patton Stevenson, Paramaribo, Dutch Guiana.
William Adams Treadwell, Albany, N. Y.
William Franklin Whitaker, Bakersfield, Cal.

The Secretary announced the following deaths:

Burr Bassell, elected Member November 4th, 1903; died February 24th, 1905.

Frederick de Funiak, elected Member May 7th, 1873; died March 29th, 1905.

Adjourned.

April 19th, 1905.—The meeting was called to order at 8.40 P. M.; President C. C. Schneider in the chair; Chas. Warren Hunt, Secretary; and present, also, 125 members and 15 guests.

A paper, entitled "The Reconstruction of the Baltimore and Ohio Railroad Bridge over the Ohio River, at Benwood, West Virginia," by J. E. Greiner, M. Am. Soc. C. E., was presented by the Secretary. The paper was discussed by Messrs. O. E. Hovey and O. E. Mogensen.

The Secretary announced the following deaths:

George Anson Marr; elected Member October 3d, 1883; died March 24th, 1905.

George Anthony Lederle; elected Junior May 2d, 1883; Member October 6th, 1886; died March 27th, 1905.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

April 4th, 1905.—President Schneider in the chair; Chas. Warren Hunt, Secretary, and present, also, Messrs. Bissell, Bowman, Craven, Deyo, Ellis, Knap, Kuichling, N. P. Lewis, Noble, Osgood and Webster.

The Building Committee was requested to secure bids on plans for the addition to the present building, and to report to the Board at a Special Meeting to be held April 20th, 1905.

The Board ordered that a discount of 50% be allowed, on the volumes of the International Engineering Congress papers, to members of the Society elected after December 31st, 1904.

Applications were considered, and other routine business transacted.

Ten Associate Members were transferred to the grade of Member, and thirteen candidates for Junior were elected.

Adjourned.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, May 3d, 1905.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and two papers will be presented for discussion, as follows: "Round-House Framing," by R. D. Coombs, Assoc. M. Am. Soc. C. E., and "A Few Remarks on Foundations," by L. L. Buck, M. Am. Soc. C. E.

Both these papers are printed in this number of *Proceedings*.

Wednesday, May 17th, 1905.—8.30 P. M.—At this meeting a paper entitled "The Irrigation System of Ontario, California," by F. E. Trask, M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings*.

Wednesday, June 7th, 1905.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed and two papers will be presented for discussion, as follows: "A Few Points in the Design of Reinforced Concrete Arches," by B. R. Leffler, Assoc. M. Am. Soc. C. E., and "Theory of the Spherical or Conical Dome of Reinforced Concrete or Metal," by William Cain, M. Am. Soc. C. E.

Both these papers are printed in this number of *Proceedings*.

ANNUAL CONVENTION.

The Thirty-Seventh Annual Convention will be held in Cleveland, Ohio, June 20th-23d, 1905. The following Committees have been appointed to take charge of the arrangements.

COMMITTEE OF THE BOARD OF DIRECTION:

ALFRED CRAVEN, *Chairman;*

N. P. LEWIS, CHARLES S. GOWEN,
W. J. WILGUS, CHAS. WARREN HUNT.

LOCAL COMMITTEE:

A. MORDECAI, *Chairman;*

WM. J. CARTER, F. C. OSBORN,
HARRY FULLER, W. P. RICE,
E. A. HANDY, J. RITCHIE,
A. M. JOHNSTON, W. H. SEARLES,
M. W. KINGSLEY, S. T. WELLMAN,
J. FRANCIS LE BARON, C. H. WRIGHT.

PRIVILEGES OF LOCAL SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

The Boston Society of Civil Engineers will welcome any member of the American Society of Civil Engineers at its library and reading room, 517 Tremont Temple, Boston, which is open on week days from 9 A. M. to 5 P. M. Members will also be welcome at the meetings, which are held in the same building, on the evenings of the fourth Wednesday in January, and the third Wednesdays of other months, except July and August.

The rooms of **The St. Louis Engineers' Club** are in the business center of St. Louis, and visiting engineers are cordially invited to use them for mail, telephone service, information, etc.

The courtesies of **The Engineers' Society of Western Pennsylvania** have been extended to members of the American Society of Civil Engineers. The rooms of the Society, 410 Penn Ave., Pittsburg, Pa., are open at all times, and meetings are held as follows, except during July and August. REGULAR SECTION, Third Tuesdays; CHEMICAL SECTION, Thursdays following third Tuesdays; MECHANICAL SECTION, First Tuesdays; STRUCTURAL SECTION, Fourth Tuesdays.

The Western Society of Engineers, Monadnock Block, Chicago, Ill., tenders to members of this Society the use of its rooms and facilities, together with the good offices of its Secretary and of a special committee appointed for that purpose.

The Civil Engineers' Club of Cleveland, Ohio, invites members of this Society to make use of the Club rooms, at any time when in Cleveland. Cards will be furnished on application to the Secretary, Mr. J. C. Beardsley.

The Engineers' Club of Central Pennsylvania has established new quarters at the corner of Second and Walnut Streets, Harrisburg, Pa., and desires to extend the courtesies of the Club to visiting members of the American Society of Civil Engineers.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an

engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

INTERNATIONAL ENGINEERING CONGRESS PUBLICATIONS.

The first three volumes of the Proceedings of the International Engineering Congress have been distributed to all Members elected prior to December 31st, 1904. There will be six volumes in all. Members have been notified that they would receive these volumes (issued as Parts A, B, C, D, E and F of Vol. LIV of *Transactions*) and asked whether they wished them bound in one of the Standard Bindings. A number of Members who have their Volumes bound regularly have not responded, and consequently will receive these volumes in paper covers, unless an order is received at once for their binding. It is urged that all who care to have these volumes bound, and who have not already done so, send in an order for such binding immediately.

The notation of these volumes, as Parts of one of the regular volumes of *Transactions,* was adopted for the convenience of Members, so that when all are received they will be consecutive on the shelf. It was not possible at the time to say how long it would take to collate the discussions and issue these volumes, and it was thought best to issue them as Parts of Vol. LIV.

It is now expected that at least five of these volumes, and possibly all, may be forwarded to Members prior to the date they will receive the regular Volume LIV, and this explanation is given so that the membership may understand that, for them, there will be seven Parts of Vol. LIV, and that the regular Volume whose shelf place should be first, will probably not be received until after these Engineering Congress Publications.

ACCESSIONS TO THE LIBRARY.

From March 8th to April 11th, 1905.

DONATIONS.*

MÉTALLURGIE DU ZINC.

Par A. Lodin. Paper, 10 x 6 in., illus., 810 pp. Paris, Yve. Ch. Dunod, 1905. 35 francs.

The preface states that information, in a condensed form, on zinc in its natural state is contained in the preliminary chapters. Then follows an account of the preparatory operations of the metallurgy of zinc, as roasting and calcining, according to the general conditions prevailing in Europe. It is stated that the principal object of the book is a description of the production of zinc by reduction and distillation in closed vessels, a complete history of the methods practiced in the past and at the present time. The accessory operations which exert a considerable influence on the final results are studied in every detail. The attempts of a number of inventors to use some other method are discussed. The publication of the present work is intended to eliminate the mystery surrounding the metallurgy of zinc and to furnish to those occupied with this industry a means of controlling the results obtained, methodically improving them by following a rational and scientific method. There is a classified index of thirteen pages.

A HANDBOOK FOR SUPERINTENDENTS OF CONSTRUCTION, ARCHITECTS, BUILDERS AND BUILDING INSPECTORS.

By H. G. Richey. Leather, 7 x 4 in., illus., 744 pp. New York, John Wiley & Sons, 1905. $1.

The preface states that this book was intended to be an every-day help to anyone engaged in building construction, and the author has tried to make it as complete and up-to-date as possible. Immediately following the preface is a list of works, author's and magazines on this subject; and the dates of the various building codes from which extracts have been taken. The book also contains, A Glossary of Names of some New Materials Used in Building. There is an index of forty-seven pages.

SUCTION GAS.

By Oswald H. Haenssgen. Cloth, 7 x 5 in., illus., 4 + 88 pp. Cincinnati, The Gas Engine Publishing Co., 1904. $1.

The preface states that this work has been published with a view of supplying the increasing demand for information on this subject in America. The design, operation, cost of running, development and possible utility of this type of gas producer are all covered in this book. There is an index of two pages.

A TREATISE ON CONCRETE PLAIN AND REINFORCED.

Materials, Construction and Design of Concrete and Reinforced Concrete. By Frederick W. Taylor and Sanford E. Thompson, Assoc. M. Am. Soc. C. E. Cloth, 9 x 6 in., illus., 18 + 585 pp. New York, John Wiley & Sons, 1905.

The preface states that this treatise is designed for practicing engineers and contractors, and also for a text and reference book for engineering students. The chapters are arranged for convenience in reference, and therefore are not always in logical order. The Concrete Data in Chapter I. presents a list of definitions and terms. The Elementary Outline of the Process of Concreting; Specifications for Cement, including the latest recommendations of committees of the societies; Classification of Cements distinguishing the various cements and limes manufactured in the United States and Europe, are among the subjects discussed. Plain and Reinforced Concrete Structures are treated in as much detail as space permits, in Chapters XXII to XXVII inclusive; methods of Cement Manufacture in its modern types are described in detail in Chapter XXVIII. This is followed by a list of References to Concrete Literature. The chapter entitled The Effect of Sea Water has been written by Mr. René Feret, of Boulogne-sur-Mer, France, who has made extended researches, and the subject Proportioning Concrete has been treated by Mr. William B. Fuller, and his practical use of mechanical analysis is fully discussed. There is an index of twelve pages.

*Unless otherwise specified, books in this list have been donated by the publishers.

CEMENT AND CONCRETE.

By Louis Carlton Sabin, M. Am. Soc. C. E. Cloth, 9 x 6 in., 10 + 507 pp. New York, McGraw Publishing Company, 1905. $5.

The preface states that this book is an attempt to place in one volume a connected story of the properties and uses of cement, giving, where practicable, sufficient tests to support the statements made, and endeavoring to show the connection between theory and practice, the laboratory and the field. The original investigations forming the basis of the work were made in connection with the construction of the Poe Lock at St. Mary's Falls Canal, Michigan, under the direction of the Corps of Engineers, U. S. Army. When not otherwise stated, the tables in the work are condensed from the results of these investigations. There is an index of eleven pages.

THE GRAPHIC METHOD BY INFLUENCE LINES FOR BRIDGE AND ROOF COMPUTATIONS.

By William H. Burr, M. Am. Soc. C. E., and Myron S. Falk, Jun. Am. Soc. C. E., Cloth, 9 x 6 in., illus., 253 pp. New York, John Wiley & Sons, 1905. $3.

The preface states that this book exhibits an entirely modern graphical treatment by the method of influence lines, of simple statically determinate structures such as bridges and roof-trusses, three-hinged arches, cantilevers and other constructions of the same general class. The simplicity, elegance, and generality of procedures by influence lines and areas afford quick and eminently practical methods of computing stresses in all forms of trusses, whether with straight, curved, or broken outlines, and with any single or multiple systems of bracing, whether square or skew, or with any manner of loading whatever. This covers plate girders and solid beams, as well as articulated or jointed structures like ordinary bridge- and roof-trusses. The stresses in roof-trusses caused by the flexure of the supporting columns are treated in detail. A sufficient number of problems are introduced to illustrate clearly the practical applications of the various methods of treatment; and the complete design of the members of a railroad bridge are given at the end of the book, to which, in the determination of the stresses, the previously deduced methods are applied. The application of these lines to statically indeterminate structures, will appear in another volume. There is an index of seven pages.

SMOKE PREVENTION AND FUEL ECONOMY.

Based on the German Work of E. Schmatolla. By Wm. H. Booth, M. Am. Soc. C. E., and John B. C. Kershaw. Cloth, 9 x 6 in., illus., 194 pp. New York, The Norman W. Henley Publishing Co., 1905. $2.50.

The preface states that the object of this book is to bring before the fuel-using public, in as brief a manner as possible, the principles of fuel combustion, and the means by which the practice of fuel combustion has been carried out. The book has grown around the author's original idea of presenting a simple translation of the German book of Ernst Schmatolla, to which the author found it necessary to add much to fit the book to English practice and to subtract other less suitable matter. It is illustrated by a few examples of English and American appliances, and mechanical stokers; which appear to fulfil the necessary requirements of thorough mixture of gases and air at a high temperature. The book contains: The Chemistry of the Combustion Process; Present Methods of Burning Fuels and their Defects; Improved Methods of Burning Fuel; The Examination of the Waste Gases, and Control of the Combustion Process. The Appendix contains, abstracts of English, German and United States patents; fuel analysis and miscellaneous extracts. There is an index of six pages.

STRUCTURAL DESIGNERS' HANDBOOK.

Giving Diagrams and Tables for the Design of Beams, Girders and Columns, with Calculations Based on the New York City Building Code. By William Fry Scott. Cloth, 9 x 6 in., illus., 8 + 158 pp. New York, Engineering News Publishing Co., 1904. $2.

The preface states that this book is essentially a diagrammatic treatise on the subject of structural design; containing a full tabulation of the properties of market shapes of materials. Its object is to shorten and possibly eliminate much of the computation and drudgery which are necessary accompaniments of structural designing. The diagrams presented are time-saving devices and illustrate graphically the relations of the various factors of proportion, span loading, etc., for the variable conditions of ordinary practice. Throughout the work the New York Building Code has been followed. Contents: Part I, Synopsis of Mechanics of the Beam and Column; Part II, Beamwork; Part III, Columns and Truss Members; Part IV, Miscellaneous. There is an index of six pages.

Gifts have also been received from the following:

Alaska Mexican Gold Min. Co. 1 pam.
Alaska United Gold Min. Co. 2 pam.
Am. Electrochemical Soc. 1 bound vol.
Am. Inst. of Min. Engrs. 1 bound vol.
Am. Soc. for Testing Materials. 1 vol.
Am. Soc. for the Prevention of Cruelty to Animals. 1 vol.
Am. Soc. Mech. Engrs. 1 vol.
Assoc. Amicale des Anciens Élèves de l'École Centrale des Arts et Manufactures. 1 vol.
Assoc. of Am. Portland Cement Mfrs. 1 pam.
Baltimore, Chesapeake & Atlantic Ry. Co. 2 pam.
Barschall, M. 1 pam.
Baudry, Ch. 1 pam.
Board of Gas & Elec. Light Commrs. 1 vol.
Braumüller, Wilhelm. 1 pam.
Brit. Fire Prevention Comm. 1 vol.
Brookline, Mass.—Water Board. 1 pam.
Brooklyn Pub. Library. 1 pam.
Buffalo—Pub. Works Dept. 1 vol.
Burlington, Vt.—Water Dept. 1 pam.
Cambria Steel Co. 1 bound vol.
Canada—Dept. of Rys. & Canals. 1 vol.
Canada—Geol. Surv. 11 pam.
Canadian Min. Inst. 2 pam.
Cincinnati—Water Dept. 1 pam.
Civ. Engrs. Club of Cleveland. 2 pam.
Cumberland Valley R. R. Co. 1 pam.
Delaware & Hudson Co. 2 pam.
Dyckerhoff & Söhne. 1 pam.
Eng. Soc. of the Univ. of Mich. 1 vol.
Engrs. Soc. of Western Pennsylvania. 1 pam.
Fisk, W. L. 1 map.
Fitchburg, Mass.—City Engr. 1 pam.
Fleming, Sanford. 1 vol.
Geographical Soc. of Philadelphia. 1 pam.
Glasgow and South-Western Ry. 1 pam.
Grand Rapids & Indiana Ry. Co. 1 pam.
Great Brit.—Patent Office. 2 vol., 16 pam.
Haverhill, Mass.—City Engr. 1 pam.
Heim, Albert. 1 pam.
Hill, J. W. 1 pam.
I. P. Morris Co. 1 pam.
Isthmian Canal Comm. 1 pam.
Japan—Imperial Earthquake Investigation Comm. 1 vol.
Johns Hopkins Univ. 1 bound vol.
Kirkpatrick, W. G. 2 pam.
Lake, J. C. 1 pam.
Lake Erie & Western R. R. Co. 1 pam.
Little Falls, N. Y.—City Engr. 1 pam.
Madras, India—Pub. Works Dept. 1 bound vol.
Manhattan Coll. 1 pam.
Mass.—Bureau of Labor. 1 bound vol.
Mass.—Highway Comm. 1 bound vol.
Master Car Builders' Assoc. 1 bound vol.
Metropolitan West Side Elevated Ry. Co. 1 pam.
Mich.—State Board of Health. 1 pam.
Middletown, Conn.—Board of Water Commrs. 1 pam.
Minn.—R. R. & Warehouse Comm. 1 bound vol.
Missouri Pacific Ry. Co. 1 pam.
Municipal Engrs. of the City of New York. 1 pam.
Naval Archts. & Marine Engrs. 1 pam.
New Bedford, Mass.—Supt. of Streets. 1 pam.
New England Water Works Assoc. 1 pam.
New South Wales—Dept. of Pub. Works. 1 pam.
New York City Record. 2 bound vol.
New York—City Comptroller. 1 bound vol.
Northern Central Ry. Co. 1 pam.
Ohio—Geol. Surv. 2 bound vol.
Ottawa Improvement Comm. 1 pam.
Pennsylvania R. R. Co. 2 pam.
Potter, Alexander. 1 pam.
Pratt Inst. Free Library. 1 pam.
Producers Supply Co. 1 bound vol.
Quinette de Rochemont, Baron E. T. 2 bound vols.
St. Louis—Merchants' Exch. 1 vol.
St. Paul, Minn.—Water Commrs. 1 pam.
Schiffbautechnische Gesellschaft. 1 bound vol.
Sears, V. A. 1 pam.
Smith, Edward & Co. 1 pam.
Snow, J. P. 1 pam.
Soc. Belge des Ingenieurs et des Industriels. 1 pam.
Soper, G. A. 1 pam.
Springfield, Ill.—Board of Trustees of the Pleasure Driveway and Park District. 1 vol.
Springfield, Mass.—Board of Water Commrs. 2 pam.
Springfield, Mass.—City Engr. 1 pam.
Troy—Water Dept. 1 pam.
U. S. Bureau of Forestry. 4 pam.
U. S. Bureau of Labor. 1 vol.
U. S. Bureau of Statistics. 1 pam.
U. S. Bureau of the Census. 1 bound vol.
U. S. Chief of Engrs. 14 pam, 13 Specif.
U. S. Interstate Commerce Comm. 6 pam.
U. S. Naval War Records. 1 pam.
U. S. War Dept. 1 bound vol.
Univ. of Pennsylvania. 1 vol.
Waltham, Mass.—Water Works. 1 pam.
Wellington—Harbour Board. 1 pam.
Willmon, J. C. 1 bound vol.
Worcester, Mass.—City Engr. 1 pam.
Worcester, Mass.—Supt. of Sewers. 1 pam.

BY PURCHASE.

The World Almanac and Encyclopedia, 1905. New York, The Press Publishing Co., New York *World*, 1904.

Brooklyn Daily Eagle Almanac, 1905, a Book of Information General of the World and Special of New York City and Long Island. New York, Brooklyn *Daily Eagle*, 1905.

Fouilles et Fondations; à l'Air Libre, Sous l'Eau, à l'Air Comprimé, Déblais Souterrains; Tunnels, Béton Armé. Par P. Frick, Paris, Vve. Ch. Dunod, 1905.

Die Entwickelung des Niederrheinisch-Westfälischen Steinkohlen-Bergbaues in der Zweiten Hälfte des 19. Jahrhunderts. Vol. VII, Berieselung, Grubenbrand, Rettungswesen, Beleuchtung, Sprengstoffwesen, Versuchsstrecke. Berlin, Julius Springer, 1904.

Official Army Register, 1905. Washington, Secretary of War, 1904.

The Naval Constructor: A Vade Mecum of Ship Design for Students, Naval Architects, Shipbuilders and Owners, Marine Superintendents, Engineers and Draughtsmen. By George Simpson, New York, D. Van Nostrand Company, 1904.

Laboratory and Factory Tests in Electrical Engineering. By George F. Sever and Fitzhugh Townsend. New York, D. Van Nostrand Company, 1904.

Royal Commission on Sewage Disposal, Supplementary Volumes Presented with the Fourth Report of the Commissioners Appointed in 1898. Vol. IV, Part I.—General Report; Part II.—Chemical Report, by C. McGowan; Part III.—Bacteriological Report, by A. C. Houston; Part IV.—Engineering and Practical Report, by G. B. Kershaw; Part V.—Methods of Chemical Analysis as Applied to Sewage and Sewage Effluents. London, Eyre and Spottiswoode, East Harding Street, Fleet Street, E. C.; and 32 Abingdon Street, Westminster, S. W., 1904,

Petrol Motors and Motor Cars, a Handbook for Engineers, Designers, and Draughtsmen. By T. Hyler White. New York, Longmans Green and Co., 1904.

The Telephone Service; its Past, its Present and its Future. By Herbert Laws Webb. London, Whittaker & Co., 1904.

Automatic Surveying Instruments and Their Practical Uses on Land and Water. By Thos. Ferguson. London, John Bale, Sons & Danielsson, Ltd., 1904.

Electric Motors; Continuous Current Motors and Induction Motors, Their Theory and Construction. By Henry M. Hobart. London, Whittaker and Co., 1904.

SUMMARY OF ACCESSIONS.

March 8th to April 11th, 1905.

Donations (including 16 duplicates)	182
By purchase	12
Total	194

MEMBERSHIP.

ADDITIONS.

		Date of Membership.
ANDREWS, HIRAM BERTRAND. 166 Devonshire St., Boston, Mass		Mar. 1, 1905
ARNOLD, BION JOSEPH. 1539 Marquette Bldg., Chicago, Ill		Mar. 1, 1905
BURT, HENRY JACKSON. Contr. Engr., Am. Bridge Co., of New York, 520 Dooly Bldg., Salt Lake City, Utah		Mar. 1, 1905
CHADBOURN, WILLIAM HOBBS, Jr. U. S. Asst. Engr., U. S. Engr. Office, Beaver, Pa	Jun. M.	Dec. 3, 1890 Mar. 1, 1905
CHAPLEAU, SAMUEL JEFFERSON. Dist. Engr., Georgian Bay Ship Canal, Dept. of Public Works, P. O. Box 347, Ottawa, Ont., Canada	Assoc. M. M.	May 1, 1901 Jan. 31, 1905
COUTLEE, CHARLES ROBERT FORAN. P. O. Box 1069, Ottawa, Ont., Can		Mar. 1, 1905
HAINES, FRANK MARCH. 2d Vice-Pres. and Gen. Mgr., Northern Texas Traction Co., 400 Main St., Fort Worth, Tex		Mar. 1, 1905
LATTA, HARRISON WAINWRIGHT. Pres., Latta & Terry Constr. Co., Pennsylvania Bldg., Philadelphia, Pa	Assoc. M. M.	Sept. 5, 1900 April 4, 1905
LOOK, MOSES JEROME. Div. Engr., Met. Water and Sewerage Board, 98 Walnut St., Clinton, Mass	Assoc. M. M.	May 6, 1903 April 4, 1905
MARDEN, WALTER REUBEN. Vice-Pres. and Chf. Engr., The United Constr. Co., 467 Broadway, Albany, N. Y	Assoc. M. M.	April 4, 1894 Feb. 28, 1905
MORRISON, HARRY JOHNSON. 513 Dillaye Memorial Bldg., Syracuse, N. Y	Assoc. M. M.	Jan. 4, 1899 April 4, 1905
MOULTON, GUY. Res. Engr., Middle Div., Dept. of State Engr. and Surv., 403 Bastable, Syracuse, N. Y		Mar. 1, 1905
NORCROSS, JOSEPH ARNOLD. Engr., New Haven Gas Light Co., 80 Crown St., New Haven, Conn		April 5, 1905
OSTRANDER, JOHN EDWIN. Prof., Mathematics and Civ. Eng., Mass. Agri. Coll., Amherst, Mass	Jun. Assoc. M. M.	May 2, 1888 Sept. 2, 1891 April 4, 1905
PENFIELD, WILLIAM HENRY. Quiney, Plumas Co., Cal		Mar. 1, 1905
POLLOCK, CHARLES DUBOIS. Asst. Engr., Bureau of Highways, Municipal Bldg., Brooklyn, N. Y	Assoc. M, M.	Jan. 8, 1902 April 4, 1905
POPE, JOHN HORTON. Asst. Engr., J. G. White & Co., 43 Exchange Pl., New York City		Dec. 7, 1904
POWERS, CORNELIUS VAN VORST. 231 West 125th St., New York City		Mar. 1, 1905

		Date of Membership.
Smith, Cecil Brunswick. 36 Toronto St., Toronto, Ont., Canada		Mar. 1, 1905
Soper, George Albert. Cons. Engr. and San. Expert, 29 Broadway, New York City...	Assoc. M.	Feb. 6, 1901
	M.	April 4, 1905
Soulé, Frank. Univ. of California, Berkeley, Cal.		Mar. 1, 1905
Strouse, William Franklin. 400 Forest Rd., Roland Park, Baltimore, Md.		Mar. 1, 1905
Taylor, Charles Frederick. Engr. and Contr., 913 Tremont Bldg., Boston, Mass.	Assoc. M.	Sept. 4, 1895
	M.	April 4, 1905

ASSOCIATE MEMBERS.

Atkinson, Asher. 49 Mine St., New Brunswick, N. J.	April	5, 1905
Blanchard, Arthur Horace. Asst. Prof. of Civ. Eng., Brown Univ.; Asst. Engr., State Board of Public Roads of Rhode Island, Brown Univ., Providence, R. I.	Jun.	Jan. 2, 1900
	Assoc. M.	April 5, 1905
Burdick, Charles Baker. 1207 Hartford Bldg., Chicago, Ill.	Mar.	1, 1905
Foote, Arthur Burling. Asst. Supt., North Star Mines Co., Grass Valley, Cal.	Mar.	1, 1905
Hewett, Bertram Henry Majendie. Res. Engr., Penn., N. Y. & L. I. R. R. Co., 1 West 34th St., New York City	April	5, 1905
Hyatt, Caleb. 515 Lexington Ave., New York City	Jun.	Mar. 3, 1903
	Assoc. M.	April 5, 1905
Kreuger, Ivar. Care, Kreuger & Co., 10 Eastcheap, London, E. C., England.	Dec.	7, 1904
Lytel, James Leonard. U. S. Geological Survey, Reclamation Service, Montrose, Colo.	Jan.	4, 1905
Moorshead, Thomas Courtney. Supt., Litchfield & Madison Ry. Co., Edwardsville, Ill.	Mar.	1, 1905
Nelson, Alexander Howard. 402 Murtland Bldg, Pittsburg, Pa.	Jun.	Nov. 1, 1898
	Assoc. M.	April 5, 1905
Nye, Algernon Sidney. Asst. Engr. to the Aqueduct Commrs., Kingsbridge, New York City.	Jun.	July 2, 1890
	Assoc. M.	April 5, 1905
Parker, William Pool. 405 Thayer Bldg., Kansas City, Mo.	Oct.	5, 1904
Proctor, Lewis Jefferson. Asst. Supt., Bureau of Public Works, San Juan, Porto Rico.	Mar.	1, 1905
Rankin, Harry Howard. (Rankin & Hengst), 301 Smithfield St., Pittsburg, Pa.	Mar.	1, 1905
Rose, Rudolf Viedt. Asst. Engr., The Niagara Falls Power Co., Niagara Falls, N. Y.	April	5, 1905
Saunders, George Crosby. Mgr., Eastern Dist., The Osborn Eng. Co., 1022 Land Title Bldg., Philadelphia, Pa.	Mar.	1, 1905

		Date of Membership.
SAYLES, ROBERT WILSON. 15 Cortlandt St., New York City		April 5, 1905
SMITH, COURTLAND ELMORE. 31 William St., Ossining, N. Y.		Mar. 1, 1905
WELLS, CLINTON GLENCAIRN. City Engr., Galveston, Tex.; Chf. Engr., Galveston & Western R. R.; Address, City Hall, Galveston, Tex	Jun. Assoc. M.	Mar. 5, 1901 Mar. 1, 1905
WHITE, GILBERT CASE. Box Q, Winston-Salem, N. C.		April 5, 1905

ASSOCIATES.

LETSON, THOMAS HERBERT. 39 Cortlandt St., New York City		Mar. 1, 1905

JUNIORS.

ANTHONY, WALTER LORING. Asst. Engr., Care, The R. H. Tingley Co., 75 Westminster St., Providence, R. I.		Jan. 5, 1904
BERNSTEIN, LESTER. Morgantown, W. Va		Feb. 28, 1905
GARMAN, HARRY OTTO. 739 Owen St., LaFayette, Ind.		Feb. 28, 1905
HALE, RICHARD KING. Chestnut Hill Ave., Brookline, Mass		April 4, 1905
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HATTON, HERBERT WATSON. 608 Market St., Wilmington, Del		April 4, 1905
LONGLEY, FRANCIS FIELDING. 38 Stone St., Watertown, N. Y.		Feb. 28, 1905
MCCONNELL, JOHN LORENZO. 414 W. Oak St., Louisville, Ky.		April 4, 1905
PARK, JAMES CALDWELL. 52A Winslow St., Watertown, N. Y.		Feb. 28, 1905
SCHULTZ, CHARLES. 307 North Third St., Hannibal, Mo.		Nov. 1, 1904
TOZZER, ARTHUR CLARENCE. 35th St. and East River, New York City		April 4, 1905
WEIDNER, CARL ROBERT. Independence, Kans		Feb. 28, 1905

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	Date of Resignation.
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DEATHS.

DE FUNIAK, FREDERICK.....Elected Member May 7th, 1873; died March 29th, 1905.

HAYES, RICHARD SOMERS.....Elected Member September 6th, 1882; died March 2d, 1905.

LEDERLE, GEORGE ANTHONY.....Elected Member October 6th, 1886; died March 27th, 1905.

MARR, GEORGE ANSON.....Elected Member October 3d, 1883; died March 24th, 1905.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(March 5th, 1905, to April 8th, 1905.)

NOTE.—*This list is published for the purpose of placing before the members of the Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal,* Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings,* Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal,* Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal,* Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions,* Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly,* Columbia Univ., New York City, 50c.
(7) *Technology Quarterly,* Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator,* Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine,* New York City, 25c.
(10) *Cassier's Magazine,* New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News,* New York City, 15c.
(14) *The Engineering Record,* New York City, 12c.
(15) *Railroad Gazette,* New York City, 10c.
(16) *Engineering and Mining Journal,* New York City, 15c.
(17) *Street Railway Journal,* New York City, 35c.
(18) *Railway and Engineering Review,* Chicago, Ill., 10c.
(19) *Scientific American Supplement,* New York City, 10c.
(20) *Iron Age,* New York City, 10c.
(21) *Railway Engineer,* London, England, 25c.
(22) *Iron and Coal Trades Review,* London, England, 25c.
(23) *Bulletin,* American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal,* New York City, 10c.
(25) *American Engineer,* New York City, 20c.
(26) *Electrical Review,* London, England.
(27) *Electrical World and Engineer,* New York City, 10c.
(28) *Journal,* New England Water-Works Assoc., Boston, $1.
(29) *Journal,* Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique,* Brussels, Belgium.
(31) *Annales de l'Assoc. des Ing. Sortis des Ecole Specciales de Gand.* Brussels, Belgium.
(32) *Memoires et Compte Rendu des Travaux,* Soc. Ing. Civ. de France, Paris, France.
(33) *Le Genie Civil,* Paris, France.
(34) *Portefouille Economique des Machines,* Paris, France.
(35) *Nouvelles Annales de la Construction,* Paris, France.
(36) *La Revue Technique,* Paris, France.
(37) *Review de Mecanique,* Paris, France.
(38) *Revue Generale des Chemins de Fer et des Tramways,* Paris, France.
(39) *Railway Master Mechanic,* Chicago, Ill., 10c.
(40) *Railway Age,* Chicago, Ill., 10c.
(41) *Modern Machinery,* Chicago, Ill., 10c.
(42) *Transactions,* Am. Inst. Elect. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussees,* Paris, France.
(44) *Journal,* Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals,* Scranton, Pa., 20c.
(46) *Scientific American,* New York City, 8c.
(47) *Mechanical Engineer,* Manchester, England.
(48) *Zeitschrift,* Verein Deutscher Ingenieure, Berlin, Germany.
(49) *Zeitschrift für Bauwesen,* Berlin, Germany.
(50) *Stahl und Eisen,* Düsseldorf, Germany.
(51) *Deutsche Bauzeitung,* Berlin, Germany.
(52) *Rigasche Industric-Zeitung,* Riga, Russia.
(53) *Zeitschrift,* Oesterreichischer Ingenieur und Architekten Verein, Vienna, Austria.
(54) *Transactions,* Am. Soc. C. E., New York City, $5.

(55) *Transactions,* Am. Soc. M. E., New York City, $10.
(56) *Transactions,* Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian,* London, England.
(58) *Proccedings,* Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions,* Mining Inst. of Scotland, London and Newcastle-upon-Tyne, England.
(60) *Municipal Engineering,* Indianapolis, Ind., 25c.
(61) *Proceedings,* Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World,* 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings,* Inst. C. E. London, England.
(64) *Power,* New York City, 20c.
(65) *Official Proceedings,* New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting,* London, England, 15c.
(67) *Cement and Engineering News,* Chicago, Ill., 25c.
(68) *Mining Journal,* London, England.
(69) *Mill Owners,* New York City, 10c.
(70) *Engineering Review,* New York City, 10c.
(71) *Journal,* Iron and Steel Inst., London, England.
(72) *Street Railway Review,* Chicago, 30c.
(73) *Electrician,* London, England, 18c.
(74) *Transactions,* Inst. of Min. and Metal., London, England.
(75) *Proceedings,* Inst. of Mech. Engrs., London, England.
(76) *Brick,* Chicago, 10c.
(77) *Journal,* Inst. Elec. Engrs., London, England.
(78) *Beton und Eisen,* Vienna, Austria.
(79) *Forscherarbeiten,* Vienna, Austria.
(80) *Tonindustrie-Zeitung,* Berlin, Germany.
(81) *Zeitschrift fur Architektur und Ingenieurwesen,* Wiesbaden, Germany.
(82) *Dinglers Polytechnisches Journal,* Berlin, Germany.

LIST OF ARTICLES.

Bridge.

Live Loads for Railroad Bridges.* Henry W. Hodge, M. Am. Soc. C. E. (54) Vol. 54, Pt. A.
Notes on Old Railway Bridges.* (21) Mar.
Methods of Expansion of Railway Bridges. Francis S. Rice. (58) Mar.
Cushioned Floor Beds for Railroad Bridges. E. K. Morse. (58) Mar.
The Monongahela River Suspension Bridge at Morgantown, W. Va.* W. H. Boughton. (13) Mar. 9.
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Repairing a Bridge Pier Foundation on the Burlington.* (15) Mar. 17.
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The New Blackwell's Island Bridge.* (46) Apr. 1.
The Reinforced Concrete Bridge at Kankakee. R. D. Gregg. (Paper read before the Illinois Soc. of Civil Engrs. and Surveyors.) (14) Apr. 1.
The General Design of the Quebec Bridge: The Structural Features of the Longest-Span Bridge Yet Undertaken. (14) Serial beginning Apr. 1.
Failure of a Bridge Pier on the Phœnix & Eastern R. R.* C. K. Conrad. (13) Apr. 6.
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*Illustrated.

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Pont Suspendu de Jons-Niévroz sur le Rhone.* J. Dor. (33) Mar. 18.
Bruchbelastung einer Hennebique-Konstruktion und einer Eisenbeton-Brücke System "Möller." Hauf. (Paper read before the Deutsche Beton Verein.) (51) Serial beginning Mar. 22.

Electrical.

Hydrodynamical and Electromagnetic Investigations Regarding the Magnetic-Flux Distribution in Toothed-Core Armatures.* H. S. Hele-Shaw, Alfred Hay, M. Inst. E. E., and P. H. Powell. (77) Vol. 34, Pt. 1.
Studies in Magnetic Testing.* G. F. C. Searle. (77) Vol. 34, Pt. 1.
The Use of Iron in Alternate-Current Instruments.* W. E. Sumpner, M. Inst. E. E. (77) Vol. 34, Pt. 1.
On the Systems of Electric Units. Moise Ascoli. (Paper read before the International Elec. Cong.) (77) Vol. 34, Pt. 1.
The Absolute Value of the E. M. F. of the Clark and the Weston Cells. Heury S. Carhart and George W. Patterson. (Paper read before the International Elec. Cong.) (77) Vol. 34, Pt. 1.
The So-Called International Electrical Units. Frank A. Wolff. (Paper read before the International Elec. Cong.) (77) Vol. 34, Pt. 1.
An Electrical Review of the Louisiana Purchase Exposition of 1904.* R. Borlase Matthews, A. M. I. C. E. (26) Serial beginning Feb. 24.
An Ideal Switchboard Base.* Leonard J. Pumphrey. (26) Feb. 24.
Efficiency of Power Transmission and Storage. (12) Feb. 24.
Surface Condensing Plant Driven by Fynn Repulsion-Induction Motor.* (26) Feb. 24; (73) Feb. 24.
Telephone Line Engineering. C. J. H. Woodbury. (3) Mar.
An Amperemeter for High Potential Currents.* H. Clyde Snook. (3) Mar.
The Alternating Current Series Motor.* (F. D. Newbury. (Paper read before the Westinghouse Electric and Mfg. Co.) (39) Mar.
Suggestions Concerning Electrical Apparatus.* W. H. Wakeman. (64) Mar.
Application of Electricity to Industrial Purposes.* J. F. C. Snell. (Abstract of Paper read before the North East Coast Inst. of Engrs. and Shipbuilders.) (73) Mar. 3.
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A High or Low Temperature Alarm.* Horace Darwin. (11) Mar. 10.
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The Phœnix-Pohl Dynamos and Motors.* (12) Mar. 24; (26) Mar. 24.
25-Ton Electric Coaling Crane at Leith Harbour.* (22) Mar. 24.
Harmonic Analyzer.* George H. Rowe. (26) Mar. 25.
Some Tests of Tantalum Lamps.* A. E. Kennelly and S. E. Whiting. (26) Mar. 25.
Some Departures in Design in a Detroit Central Power Station. (14) Mar. 25.
Electric Power Transmission in the Missouri Lead Mining District.* (13) Mar. 30.
Electricity from Water Power Versus Gas. Alton D. Adams. (10) Apr.
Shipyard Cranes and Their Functions in Marine Construction.* Jos. S. Shultz. (9) Apr.
The Erection of Alternating-Current Machines.* (64) Apr.
Principles and Applications of Mercury Vapor Apparatus. F. Von Keller. (2) Apr.
The Meter Department of the New York Edison Company.* (27) Apr. 1.
Electric Power for Refrigeration.* J. C. Chamberlain. (27) Apr. 1.
Brush Core-Type Transformer.* (27) Apr. 1.
Single-Phase Motors for Elevator, Hoist and Traveling Crane Service.* (27) Apr. 1.
Cooper Hewitt Mercury Vapor Converter.* (27) Apr. 1.
Electromagnetic Clutch.* (27) Apr. 1.
Automatic Motor Starters.* (27) Apr. 1.
Oil-Film Receiver for Space Telegraphy.* (From *Western Electrician.*) (19) Apr. 1.
An Automatic Electric Welding Machine.* Emile Guarini. (20) Apr. 6.
The Construction of a Four-Inch Spark Induction Coil.* Thomas R. Hopper. (19) Apr. 8.
Les Forces Motrices des Lacs de Joux et de l'Orbe (Suisse).* C. H. Perrin. (33) Serial beginning Feb. 25.
Hydromechanische Einrichtungen von Neueren österreichischen Elektrizitätswerken.* Gustav Witz. (53) Feb. 24.
Über die Akustik von Hörsälen und ein Instrument, Sie zu Bestimmen.* Sigm. Exner. (53) Mar. 10.
Der Elektrische Kohlelichtbogen im Vakuum. A. Hoerburger. (82) Serial beginning Mar. 25.

Marine.

The New Cunard Liner *Caronia.* (11) Feb. 24; (46) Mar. 11.
The French Armoured Cruiser *Ernest Renan.** (12) Mar. 3.
The Triple-Screw Turbine-Driven Cunard Liner *Carmania.* (11) Mar. 3.
Apparatus for Recording the Vibrations of Steamers.* (11) Mar. 3.
The Screw Propeller.* R. de Villamil. (12) Serial beginning Mar. 3.
Electrical Equipment of Messrs. Harland & Wolff's Shipbuilding Works.* (73) Serial beginning Mar. 10.
The Yarrow-Napier Motor-Boat.* (11) Mar. 10.
The Relation of Depth of Water to Speed and Power of Ships.* (13) Mar. 16.
A General Discussion of Resistance and Power Consumption of Ships in Different Depths of Water.* D. W. Taylor. (13) Mar. 16.
The 10 000-Ton Lake Vessels.* (20) Mar. 16.
Admiral Fleuriais's Gyroscopic Horizon.* (11) Mar. 17.
Scouts (in the Modern Navy). (12) Mar. 17.
The Development of Torpedo-Boat Destroyers. W. J. Harding. (Abstract of Paper read before the Institute of Marine Engrs.) (12) Mar. 17.
Steam Trials of H. M. S. *Carnarvon.** (11) Mar. 17.
The First-Class Japanese Battleship *Kashima.** (12) Mar. 24.
Shipyard Cranes and Their Functions in Marine Construction.* Jos. S. Shultz. (9) Apr.
The *Victorian:* The First Turbine Atlantic Liner.* (46) Apr. 8.
Turbines *vs.* Reciprocating Engines in Marine Service. (46) Apr. 8.
Influence de la Profondeur de l'Eau sur la Vitesse des Torpilleurs.* (33) Mar. 11.

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The Domestic Range Boiler.* (70) Serial beginning Dec.
Kosmos Portland Cement Co.* (67) Feb.
The Paterson Condensation-Water Purifier and Grease Eliminator.* (73) Feb. 24.
Science in the Iron Foundry. J. E. Stead. (Abstract of Paper read before the Cleveland Inst. of Engrs.) (22) Feb. 24; (47) Feb. 25; (12) Mar. 3.
Efficiency of Power Transmission and Storage. (12) Feb. 24.
Tests of Tools of High-Speed Steel.* (12) Feb. 24.
Automatic Hoist.* (11) Feb. 24.
Universal Woodworking Machine.* (11) Feb. 24.
The Lubrication of Steam Engines and Machinery. (47) Serial beginning Feb. 25.
A Gauge for Measuring the Depth of Fluid in Tanks.* (47) Serial beginning Feb. 25.
Machine Tool Calculations. Thomas R. Shaw. (47) Serial beginning Feb. 25.
The Krell Co_2 Recorder.* (47) Feb. 25.
A Comparison of the Calorific Power of Coal Gas and Mixed Coal and Carburetted Water Gases. W. C. Young. (66) Feb. 28.
Notes on the Reconstruction of a Small Gas-Works.* A. T. Harris. (Paper read before the Midland Assoc. of Gas Mgrs.) (66) Feb. 28.

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Open Air *vs.* Tunnel Drying of Brick. F. Vogt. (Paper read before the Wisconsin Clayworkers' Assoc.) (76) Mar.
Technical Consideration of Sand and Lime in Regard to Sand-Lime Brick. I. Frank. (76) Mar.
Determination of Exponents of Adiabatics.* Thomas M. Gardner. (3) Mar.
Hydraulic Compressed Air in Connecticut.* J. Herbert Shedd. (28) Mar.
Important Modern Metallurgical Establishments. (La Société John Cockerill, Seraing.)* L. Ramakers. (41) Mar.
The New Sixteenth Street Plant of Joseph T. Ryerson & Son.* (41) Mar.
The Use of Coke Oven Gas in Gas Engines.* (64) Mar.
Briquetted Fuels, Foreign and Domestic.* G. M. Randall. (64) Mar.
The Advantage of a Scientific Basis for Determining the Value of Fuels. Henry J. Williams. (28) Mar.
Rope Driving. C. Boysen. (64) Mar.
Blast Furnace Gas Engines at the Ilsede Iron Works.* E. Guarini. (64) Mar.
Cylinder Dimensions and Engine Economy.* Sterling H. Bunnell. (64) Mar.
A New Scheme in Rope Transmission.* Geo. F. Willis. (64) Mar.
Superheater Duties and Design. Franz Koester. (64) Mar.
Loss of Fuel by Presence of Combustible in Refuse.* Hartley Le Huray Smith. (64) Mar.
A Compound Superheater.* R. Hildebrand. (64) Mar.
Formulas for Calculating the Size of Wire Ropes. (45) Mar.
Box-Car Loaders: A Description of Some of the Early Types and Their Development to Those in Practical Use at the Present Time.* William L. Affelder. (45) Mar.
A Furnace for Burning Wet Tan Bark.* (64) Mar.
Compound Corliss Spinning Mill Engine.* (12) Mar. 3.
Machine Tools for Structural Ironwork.* (12) Mar. 3.
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Safety Appliances for Cotton-Mules: Faller-Hammers.* J. H. Crabtree. (11) Mar. 3.
The Western Electric Co.'s Factory, North Woolwich.* (26) Mar. 3.
The Frodingham Iron and Steel Company's New Electrical Plant.* (22) Mar. 3.
The Naphthaline Question. J. F. Smith. (Abstract of Paper read before the Yorkshire Junior Gas Assoc.) (24) Mar. 4.
Combined Bending and Torsion in Shafts.* Geo. A. Lister. (47) Mar. 4.
Swaging and Forging Machine.* (47) Mar. 4.
Some Notes on Gas-Engine Design. H. Diederichs. (From *Sibley Journal of Eng.*) (47) Serial beginning Mar. 4.
Improvements in Planing Machines.* (47) Mar. 4.
The American Diesel Engine. Norman M'Carty. (Read before the Northwestern Elec. Assoc.) (24) Mar. 6.
Cookers, Meters, and Grooves of Customs.* W. G. Quicke. (66) Mar. 7.
The Utilization of Exhaust Steam by the Rateau System.* P. J. Mitchell. (62) Serial beginning Mar. 9.
"Flash" Boilers for Steam-Cars. J. S. V. Bickford. (11) Mar. 10.
High Speed Two-Stage Air Compressor.* (22) Mar. 10.
Lathe for Rotors of Large Steam-Turbines at Clydebank, N. B.* (11) Mar. 10.
Elastic Wheels.* (12) Serial beginning Mar. 10.
Coke By-Products and the Utilization of Gases. G. Blake Walker. (Abstract of Lecture before the National Assoc. of Colliery Mgrs.) (22) Mar. 10.
The Watson-Stillman Works.* (18) Mar. 11.
Modern Commercial Grinding. W. Muston. (Abstract of Paper read before the Birmingham Assoc. of Mech. Engrs.) (47) Mar. 11.
A New Belgian Process of Manufacturing Weldless Chains.* Emile Guarini. (19) Mar. 11.
The National Portland Cement Works, Martins Creek, Pa. (14) Serial beginning Mar. 11.
The Removal of Naphthalene from Coal Gas during the Process of Condensation. William Young. (66) Mar. 14.
Practical Record-Sheets for Gas-Works. W. L. Walker. (Extracts from Paper read before the New England Assoc. of Gas Engrs.) (66) Mar. 14.
The Schoen Steel Wheel.* W. M. Johnson. (72) Mar. 15.
A New External Combustion Engine.* (20) Mar. 16; (14) Mar. 25; (15) Mar. 31.
Utilization of Surplus Blast-Furnace Gas for Electric Power Development. F. Du P. Thomson. (From *Electrochemical and Metallurgical Industry.*) (13) Mar. 16: (14) Mar. 18.
The Use of Waste Gases in Large Gas Engines. Max Rotter. (Paper read before the Illinois Steel Works Scientific Club.) (20) Mar. 16.
A Canadian Dellwik-Fleischer Water Gas Plant. Ernst A. Sjöstedt. (Paper prepared for the Canadian Min. Inst.) (20) Mar. 16.
The Renard Automobile Road Trains.* (11) Mar. 17.
Heavy Turret-Lathe for 6-in. Black Steel Bars.* (11) Mar. 17.
New Heavy-Duty Vulcan Shovel.* (15) Mar. 17.
A New Steam Motor Wagon.* (12) Mar. 17.
12½ in. Electric Lathe.* (12) Mar. 17.
1 200 Horse-Power Gas Engine. (12) Mar. 17.
Strength of Shafts and Pins.* Geo. A. Lister. (47) Mar. 18.
Foundry Blackings. N. W. Shed. (47) Mar. 18.
An Iron Foundry Electrically Driven Plant.* (27) Mar. 18.
Traveling Cableways with Overhanging Tail Towers.* (14) Mar. 18.
A New Rotary Engine.* (19) Mar. 18.

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Epicyclic Trains.* Thornton Knowles. (From *Technics.*) (19) Mar. 18.
The Importance of Fire Brick Materials to the Modern Retort House. H. A. Carpenter. (Paper read before the New England Assoc. of Gas Engrs.) (24) Serial beginning Mar. 20.
A Brief Outline of Gas Works' Chemistry. H. B. Harrop. (Paper read before the Wisconsin Gas Assoc.) (24) Mar. 20.
A New Adjustmeut of the Gas-Exhauster Regulators.* (66) Mar. 21.
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The Rowland Air Compressor.* (20) Mar. 23.
The Bryan Vacuum Molding Machine.* (20) Mar. 23.
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Pipe-Flange Drilling-Machine.* (11) Mar. 24.
Steel Tubes as a Substitute for Cast Iron Mains.* (22) Mar. 24.
Vibration Problems in Engineering.* (11) Mar. 24.
New Heavy Design of Upright Drill.* (17) Mar. 25.
The Construction and Working of a Compound Petrol Motor.* Edward Butler, M. I. Mech. E. (47) Mar. 25.
Superheated Steam. A. G. Gibson. (Paper read before the Owens Coll. Eng. Soc.) (47) Serial beginning Mar. 25.
Working Results of a Steam Turbine Plant. (47) Mar. 25.
Working with Deep Purifiers. (24) Mar. 27.
Distribution Pickings.* (24) Mar. 27.
Producer Gas and Producers. A. H. Whitelaw. (Abstract of Paper read before the Scottish Junior Gas Assoc.) (66) Mar. 28.
Concentrating Ammoniacal Liquor.* D. D. Barnum. (Paper read before the New England Assoc. of Gas Engrs.) (66) Mar. 28.
Altitude as a Factor in Engine and Boiler Design. Lindsay Duncan. (13) Mar. 30.
The Plant of the Ridgway Machine Tool Company.* (20) Mar. 30.
The Ridgway Boring and Turning Mill.* (20) Mar. 30.
The Williams Magnetic Clutch.* (20) Mar. 30.
The Ronay Ore Briquetting Process. (20) Mar. 30.
A Novel Yard Sweeper.* (15) Mar. 31.
Gas Compressing Plant at Hundred, W. Va.* (64) Apr.
New German Portable Tool Heads for Electric Driving.* Frank C. Perkins. (41) Apr.
Automatic Motor Starter for Electrically-Driven Pumps.* (41) Apr.
The Use of Dynamometers.* N. Ronneberg. (41) Apr.
Improved Method for Making Machine Keys.* Thos. Beasley. (41) Apr.
New Boring Bar.* (41) Apr.
Some New Steam Turbine Ideas.* (64) Apr.
Gas Power Plant at Haysham Harbor.* (64) Apr.
Forced Circulation in Steam Boilers.* (64) Apr.
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Electricity from Water Power Versus Gas. Alton D. Adams. (10) Apr.
Road Wheels for Mechanical Vehicles.* R. G. L. Markham, M. Inst. Mech. E. (10) Apr.
Natural Hydraulic Cement: Grinding the Clinker. Edwin C. Eckel. (60) Apr.
24-Inch Back Geared Crank Shaper.* (25) Apr.
Planer with Pneumatic Reversing Mechanism.* (25) Apr.
An Economical Power Plant.* (25) Apr.
Kiln Damper Improvements.* William Baillie, Jr. (76) Apr.
The Kilborn Process for Finishing and Veneering Brick.* (76) Apr.
The Superheating of Steam, and its Influence on Engine Economy.* R. M. Neilson. (9) Apr.
Practical Investigations in the Gas-Turbine Problem. Charles E. Lucke. (9) Apr.
An Automatic Gear-Clutch.* (9) Apr.
An Improved Form of Ammonia Stills.* George E. Thomas and Claude M. Dugan, Jr. (From *Journal* of the Amer. Chem. Soc.) (24) Apr. 3.
The Hendey Oscillating Milling Machine.* (20) Apr. 6.
The Plant of the Standard Scale & Supply Company.* (20) Apr. 6.
Recent German Gas Engines.* E. Meyer. (Abstract of Paper read before the Verein Deutscher Eisenhuttenleute.) (62) Apr. 6.
The Smith Box-Car Loader.* (16) Apr. 6.
Liquid Fuel for Furnace Equipment. W. N. Best. (46) Apr. 8.
Nouveau Moteur à Explosions ou Combustion Intérieure dit Moteur "Maynard." E. Maynard. (36) Feb. 25.
Chaudière Inexplosible, Système Castelnau.* (34) Mar.
Nouveaux Protecteurs pour Meules Artificielles.* Henri Mamy. (33) Mar. 4.
La Turbine à Vapeur de l'Allgemeine Elektricitäts Gesellschaft.* (33) Mar. 4
Expériences sur des Compresseurs d'Air à Grande Vitesse.* (33) Mar. 18.
Machine à Charger et Décharger les Cornues à Gaz Système Oerlikon et Bertrand.* (33) Mar. 25.
Construction des Machines Mesure des Efforts Développés pour le Tournage de la Fonte et de l'Acier.* (33) Mar. 25.
Das Automobilwesen auf der Weltausstellung in St. Louis, 1904.* W. Pfitzner. (82) Serial beginning Feb. 11.
Ueber die Directe Wägung von Naphtaproducten in Stationären Behältern und die Pneumatische Waage von N. I. Sacharoff.* M. Rakusin. (52) Feb. 15.
Zur Theorie der Drahtseile. Josef Hrabák. (53) Feb. 24.
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Die Steuerungen der Ventildampfmaschinen.* Straube. (82) Serial beginning Feb. 25.

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Gross-Gasmaschinen.* A. Riedler. (48) Feb. 25.
Bericht über Leistungsversuche an einer 500 Pferdigen Koksofengasmaschine. Eugen Meyer. (48) Feb. 25.
Die Berechnung des Mechanischen Wirkungsgrades und der Leistung von Gasmaschinen. A. Riedler. (48) Feb. 25.
Die Schraubenfabrikation.* Albert Ohnstein. (52) Feb. 28.
Sicherheitsventile, Insbesondre Solche mit Hohem Hub.* P. H. Rosenkranz. (48) Mar. 4.
Die Kalorischen Eigenschaften des Wassers und Seines Dampfes bei Hohen Temperaturen. C. Dieterici. (48) Mar. 4.
Hebezeuge und Fördereinrichtungen auf der Weltausstellung in St. Louis, 1904.* Georg v. Hanffstengel. (82) Serial beginning Mar. 4.
Verwendung von Kalt Erblasenem Roheisen zur Flusseisendarstellung. Dr. Geilenkirchen. (50) Mar. 15.
Das Trocknen von Kalksandsteinen und Ziegeln. (80) Mar. 23.
Auf Zug Beanspruchte Indikatorfedern. R. Schwirkus. (48) Mar. 25.
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Wärmedurchgangsversuche mit dem Dampfüberhitzer von Heizmann.* Otto Berner. (48) Serial beginning Mar. 25.
Maschinelle Einrichtungen für das Eisenhüttenwesen.* Fr. Frölich. (48) Mar. 25.
Die Graphische Ermittlung des Schwungradgewichtes, ein Beitrag zur Graphischen Dynamik.* F. Wittenbauer. (48) Mar. 25.
Abstufungstafel für Dampfturbinen.* Donát Bánki. (48) Mar. 25.
Untersuchungen an der Heusinger-Steuerung. W. Pfitzner. (48) Mar. 25.

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Concentrating Tables: With a Discussion of the Principles of Concentration and Their Application in Practice. Charles W. Comstock. (45) Mar.
The Assaying of Tin and Terne Drosses. George P. Maury. (58) Mar.
Open-Hearth Furnaces.* G. L. Luetscher. (58) Mar.
Steel as an Engineering Material. William Stuart Standiford. (41) Mar.
The Use of Dried Air in the Blast Furnace. A. Pourcel. (From *Revue de Metallurgie.*) (22) Mar. 3.
Pig-Irons and their Use in the Foundry and Forge.* E. Adamson. (Abstract of Paper read before the Manchester Assoc. of Engrs.) (22) Mar. 3; (47) Serial beginning Mar. 18.
Electro Production of Iron and Steel. (12) Mar. 3.
Making Basic Open-hearth Steel Without Scrap. (From the *Iron Trade Review.*) (16) Mar. 9.
Recent Developments in Electric Smelting in Connection with Iron and Steel.* F. W. Harbord. (Paper read before the Faraday Soc.) (22) Mar. 10; (73) Serial beginning Mar. 17; Abstract (47) Mar. 25.
The McDonald Blast Furnace Charging Apparatus.* (20) Mar. 16.
Cyanidation of Silver in Mexico. Hugh G. Elwes. (16) Mar. 16.
The Holthoff Revolving-Hearth Roasting Furnace.* (16) Mar. 16.
Steel and Wrought Iron Pipe.* Frank N. Speller. (Paper read before the Canadian Min. Inst.) (22) Mar. 17; (47) Mar. 18.
Effect of Sulphur on Silicious Pig Iron. G. J. Ward and A. H. Longden. (Paper read before the Society of Chem. Industry.) (12) Mar. 17.
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A New Process for Refining Pig Iron. J. B. Nau. (20) Serial beginning Mar. 23.
The Baltic Stamp Mill: Lake Superior Copper Region.* (13) Mar. 23.
The Probable Reactions of Hot Blast Moisture. A. D. Elbers. (62) Mar. 30.
Notes on Concentrating Mills: A Typical Arrangement of Samplers, Crushing, and Sizing Machinery in a Modern Concentrating Mill.* Alfred Harvey. (45) Apr.
The Metallurgical Practice in the Black Hills, South Dakota. Charles H. Fulton. (45) Apr.
Aciers Spéciaux. J. Malette. (36) Feb. 25.
Windtrocknung und Turbogebläse.* Prof. Mathesius. (50) Mar. 1.
Vorschläge zur Modernisierung Veralteter Walzwerksanlagen. Adolf Röck. (50) Mar. 1.
Erzbrikettierungsanlage auf dem Hüttenwerke der Société des Usines Metallurgiques et Mines de Kertsch in Kertsch, Südrussland. Zeidler. (50) Mar. 15.
Ueber den Einfluss des Pressens auf den Zustand der Metalle. Haedicke. (82) Mar. 18.
Über Gewinnung von Stahl im Elektrischen Ofen.* Viktor Engelhardt. (53) Serial beginning Mar. 24.

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Fortifications. George W. Goethals. (54) Vol. 54, Pt. A.
Signalling in War Service with Telegraph and Telephone.* M. C. Sullivan. (10) Apr.

Mining.

The Operation of Mines in France. E. Gruner. (Tr. from the French by Paul A. Seurot.) (54) Vol. 54, Pt. A.
Mining Engineering in the United States. E. Gybbon Spilsbury, M. Am. Soc. C. E. (54) Vol. 54, Pt. A.
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The Preparation of Anthracite: Changes Which Have Taken Place in the Practice During the Past Twenty-Five Years.* (45) Mar.
Flat Top Mine.* Samuel H. Lea. (45) Mar.
A Substitute for Blasting in Coal Mines.* Stanley Nettleton. (45) Mar.
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Electric Pumping Plant for the Comstock Lode Mines.* (27) Mar. 4.
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Water Supply to Towns in Relation to Mining. John Unsworth. (Paper read before the National Assoc. of Colliery Mgrs.) (22) Mar. 10.
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Mechanical Coal Conveying at the Face, with Especial Reference to the "Blackett" Conveyor and its Work at Derwent Colliery, Co. Durham.* Harry Palmer. (From *Journal* of the British Soc. of Min. Students.) (22) Mar. 17.
Application of Electric Power in Collieries. G. M. Brown. (Paper read before the Rugby Eng. Soc.) (26) Mar. 24; Abstract (73) Mar. 17.
Some Notes for Effecting Economy in the Use of Safety-Lamp Oil.* (22) Mar. 24.
Pumping the Comstock Lode Mines.* Carl George P. de Laval. (14) Mar. 25.
Testing Coals and Lignites at the St. Louis World's Fair.* Edward W. Parker. (9) Apr.
Winding Engines Generally, and Particularly for Depths Exceeding 1 000 Feet, with Parallel Drums.* W. J. Dam. (45) Apr.
Sinking with the Bucket: Some Devices for Guiding and Handling Buckets in Shafts with Safety and Convenience.* (45) Apr.
Bituminous Coal Washing.* L. A. Harding and G. R. Delamater. (45) Serial beginning Apr.
Anthracite Timbering.* (45) Apr.
Brown Hematite Ores: Methods of Prospecting, Mining, and Washing the Soft Iron Ores of the Birmingham District, Alabama.* W. R. Crane. (45) Apr.
The Coal Mines on the West Side Belt Railroad.* Samuel Sanford. (16) Apr. 6.
Springs on Crushing Rolls. Lewis Searing. (16) Apr. 6.

Miscellaneous.

Engineering Education. Robert Fletcher, Assoc. Am. Soc. C. E. (54) Vol. 54, Pt. A.
Engineering Education. Calvin M. Woodward. (54) Vol. 54, Pt. A.
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La Représentation des Situations Atmosphériques.* A. Bracke. (31) Pt. 3, 1904.
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Some Street Lighting Results.* R. Watson. (Paper read before the Manchester District Inst. of Gas Engrs.) (66) Feb. 28.
A Rolling Road for Horses and Wagons.* Arthur B. Weeks. (46) Mar. 11.
The Construction of Section 2, Riverside Drive Extension, New York.* (14) Mar. 25.
Traction Tests on Brick and Asphalt Pavements. (Abstract of Rept. of Committee of Iowa Eng. Soc.) (60) Apr.
Joint Fillers for Brick Pavements. Ira O. Baker. (76) Apr.
Cement Filler for Brick Pavements. E. A. Kemmler. (60) Apr.
The Modern Steam Fire Engine. F. F. Loomis. (Abstract of Paper presented before the Ohio Soc. of Mech. Engrs. and Steam Engrs.) (20) Apr. 6.
Les Moyens de Combattre ou d'Empêcher la Poussière. M. G. Forestier. (32) Dec.

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The Denver, Northwestern and Pacific Ry.* W. P. Hardesty. (13) Mar. 9.
High Reinforced Concrete Retaining Wall Construction at Seattle, Wash.* C. F. Graff. (13) Mar. 9.
Track Elevation and Depression at Milwaukee.* (13) Mar. 9.
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The Bradford Draft Gear.* (40) Mar. 10.
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Mathematics of the Paper Location of a Railroad. J. C. L. Fish, Assoc. M. Am. Soc. C. E. (13) Mar. 16.
Line Improvements between Indianapolis and Cincinnati, C., C., C. & St. L. R. R.* Geo. A. Stearns. (13) Mar. 16.
A New Material for Smoke Jacks.* (15) Mar. 17.
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A Simple Easement Curve.* Paul Sterling. (15) Mar. 17.
Supplying Electric Current for Interlocking Plants. C. C. Anthony. (15) Mar. 17.
The Canadian Northern Railway in the West.* R. D. Willson. (15) Mar. 17.
Coal, Sand and Ash Handling Plants at McKees Rocks.* (15) Mar. 17.
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New York Central & Hudson River R. R. Power Station. (18) Mar. 18.
The Completion of the Simplon Tunnel.* Charles R. King. (46) Serial beginning Mar. 18.
A Method for Standardizing Maintenance of Way Forces. H. W. Church. (18) Mar. 18.
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Buildings. (Abstract of Rept. presented before the Amer. Ry. Eng. and M. of W. Assoc.) (40) Mar. 24.
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The Harvey Friction Draft Spring.* (40) Mar. 31; (15) Apr. 7.
Design and Operation of a Modern Freight Yard.* Joseph T. Richards. (2) Apr.
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Prevention of Rail Lengthening and Track Spreading.* Hugo Muench. (41) Apr.
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Proposed Freight Subway for New York. (18) Apr. 1.
Hump Yards at Dewitt, N. Y. C. & H. R. R. R.* (18) Apr. 1.
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The Campbell Concrete Tie, E., J. & E. Ry. (18) Apr. 1.
The New Chicago-St. Louis Line of the Chicago & Eastern Illinois Ry.* (13) Apr. 6.
Electric Traction. Ernest Gerard. (From Bulletin of the International Ry. Cong.) (40) Apr. 7.
The Parting of the Ways: From Steam to Electricity.* (19) Apr. 8.
The Lofty Pecos Viaduct on the Southern Pacific Railway.* Day Allen Willey. (46) Apr. 8.
Application du Frein Westinghouse aux Trains de Marchandises.* (34) Serial beginning Mar.
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The Waterloo and City Railway: Working Results.* Herbert Jones. (Abstract of Paper read before the Tramways and Light Rys. Assoc.) (73) Serial beginning Feb. 24.
The East Boston Tunnel of the Boston Subway System.* (41) Mar.: (15) Mar. 10.
An Unusual Power-Station Trouble.* L. H. Pike. (64) Mar.
The Electrical Equipment of the New Steel Cars for the New York Subway.* L. B. Stillwell. (17) Mar. 4.
Steel Passenger Cars on the Metropolitan Elevated Ry., Chicago.* (18) Mar. 4.
The Electrification of the London Underground Electric Railways Company's System.* S. B. Fortenbaugh. (17) Mar. 4.
Detachable Trolley Harp.* (17) Mar. 4.
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The Construction of Section I, New York Rapid Transit R. R.* (14) Mar. 11.
A New Type of Convertible Car for the Brooklyn Rapid Transit Company.* (17) Serial beginning Mar. 11.
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Recent Work of the Electric Railway Test Commission of the Saint Louis Exposition.* Henry H. Norris. (72) Mar. 15; (40) Mar. 24; (15) Apr. 7.
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Tramway Overhead Equipment Materials. H. M. Sayers. (Read before the Tramways and Light Railways Assoc.) (72) Mar. 15.
Murnau Ober-Ammergau Single-Phase Railway.* (26) Mar. 17; (17) Apr. 1.
Manganese Steel Rails on the Boston Elevated.* (15) Mar. 17.
The Leitner-Lucas System of Electric Train Lighting.* (26) Serial beginning Mar. 17.
Power House of the Indianapolis & Cincinnati Traction Co.* (14) Mar. 18; (17) Mar. 18.
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Report upon Increasing the Capacity and Reducing the Noise of the Union Elevated Railroad of Chicago.* (17) Mar. 18; (13) Mar. 23; Abstract (72) Mar. 15; (15) Mar. 31.
An Air-Resistance Dynamometer Car.* (13) Mar. 23; (17) Mar. 25; (18) Mar. 25.
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Sanitary.

The Requirements of House Heating Boilers Using Bituminous Coal.* Albert A. Cary. (Paper read before the Amer. Soc. of Heat. and Vent. Engrs.) (70) Feb.
Drain Tile, Its Use and Method of Manufacture. Charles Burridge. (Paper read before the Wisconsin Clayworkers' Assoc.) (76) Mar.
A Test of Hot Blast Heating Coils.* L. S. Poage and D. C. Thomas. (70) Mar.
Test of an Indirect Heater Coil.* S. C. Root. (1) Feb.
The Sewage Disposal Works at Saratoga, N. Y.* F. A. Barbour. (1) Feb.
The Manufacture of Sanitary Pipe.* A. J. Claude. (76) Mar.
Contribution to the Biochemistry of Sewage Purification: The Bacteriolysis of Peptons and Nitrates. Stephen DeM. Gage. (7) Mar.
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A Traveling Form for Constructing the Invert of Concrete Sewers.* Robert R. Evans. (13) Mar. 9.
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Heating and Air Washing in a Works Office Building, Pittsburg.* (14) Mar. 18.
A Movable Form for Concrete Sewers.* Robert R. Evans. (14) Mar. 25.
Heating and Ventilating Trinity Church, Portland, Ore.* (14) Apr. 1.
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Nouveaux Procédés d'Epuration des Eaux d'Égout et des Eaux de Sources ou de Rivières.* G. Richou. (33) Mar. 18.
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Some Non-Metallic Materials Used in Buildings and Other Constructions. E. R. Buckley. (Paper read before the Wisconsin Clayworkers' Assoc.) (76) Mar.

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Concrete-Steel Construction.* C. A. P. Turner. (1) Feb.
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Economical Construction of Reinforced Concrete Beams and Floor Slabs. Charles R. Steiner. (13) Mar. 9.
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Disintegration of Portland Cement Briquettes by Oil and Experiments to Prevent it.* James C. Hain, Assoc. M. Am. Soc. C. E. (13) Mar. 16; (15) Mar. 17; (18) Mar. 18; (14) Mar. 25.
Steel and Wrought Iron Pipe.* Frank N. Speller. (Paper read before the Canadian Min. Inst.) (22) Mar. 17; (47) Mar. 18.
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Some Common Defects in Timber and Their Causes.* Harold Busbridge. (From *Technics.*) (19) Mar. 25.
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Concrete Pile Foundation for a Large Warehouse.* (14) Apr. 1.
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The Decomposition of Cements by Sea Water. Henri Le Chatelier. (Paper prepared for the International Soc. for Testing Materials.) (62) Serial beginning Apr. 6.
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Bemerkungen zu "Le Chateliers Forschungen über Baryt-Zemente." Eduard Jordis and E. H. Kanter. (80) Feb. 23.
Ueber das Ausbringen von Marmorkalk. Dr. Kosmann. (80) Feb. 25.
Beitrag zur Beurteilung der Mörtelfestigkeit in den Bauwerkenmattern. (From *Zentralblatt der Bauverwaltung.*) (78) Mar.
Das Palais der Waadtländischen Kantonalbank in Lausanne.* (78) Mar.
Die Dehnungsfähigkeit des Armierten Betons. A. Considère. (Extract from Mitteilungen der französischen Akademie der Wissenschaften.) (78) Mar.
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Die Neuen Englischen Normen für Portlandzement. (80) Mar. 18.
Das Zerrieseln, Kalkbasischer Silikatmassen und der Zusammenhang zwischen den Portlandzementmineralien Felit und Belit.* Hubert Kappen. (80) Mar. 25.

Topographical.

Municipal Sub-Surface Construction Maps.* Hubert S. Wynkoop. (14) Apr. 1.

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Water Supply.

The Purification of Water for the Production of Steam. J. O. Handy. (54) Vol. 54, Pt. A.
Hydraulic Rock-Borer.* (12) Feb. 24.
The Direct Pumping Method of Water Supply in Use at Taunton, Mass. George A. King. (28) Mar.
Haskell's Brook Reservoir and Dam, Gloucester, Mass.* H. W. Spooner. (28) Mar.
Description of Concrete-Steel Water Tower and Standpipe at Fort Revere, Hull, Mass.* Leonard S. Doten. (28) Mar.
Water Tank and Tower for East Providence, R. I.* F. M. Bowman. (28) Mar.
Repairs to the Lining of a Small Reservoir on Powder Horn Hill, Chelsea, Mass.* (28) Mar.
Superheated Steam in Pumping Engines.* E. H. Foster. (28) Mar.
A Simple Method of Calculating Water Analyses and Amounts of Substances to be Added for Prevention Scale and Corrosion in Boilers.* Samuel S. Sadtler. (3) Mar.
Hydraulic Compressed Air in Connecticut.* J. Herbert Shedd. (28) Mar.
Flow of Water Through Pipes Fed by Reservoirs.* Samuel Diescher. (58) Mar.
The Electrical Purification of Water.* R. Hartenfels. (64) Mar.
The Starrett System of Pumping Water.* (64) Mar.
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Experiments on Reinforced Concrete Pipes made for the U. S. Reclamation Service.* J. H. Quinton, M. Am. Soc. C. E. (13) Mar. 9.
An Automatic Regulating Valve for Reservoirs or Stand-Pipes Supplied from a Higher Elevation.* J. W. Ledoux, M. Am. Soc. C. E. (13) Mar. 9.
Accuracy Tests of Water Meters at Des Moines, Ia.* Chas. B. Burdick. (Abstract of Paper read before the Illinois Soc. of Engrs.) (13) Mar. 9.
Interesting Power Plant at Olympia, Washington.* (17) Mar. 11.
The Monitor Duplex Steam Pump.* (20) Mar. 16.
Experiments on the Dynamics of Fluids.* (11) Serial beginning Mar. 17.
The Softening of Hard Water by Heating It Under Pressure.* Nicholas Knight. (13) Mar. 23.
The Revised Plans for a Fire-Protection Water System for New York.* (13) Mar. 23; (14) Mar. 25.
River Discharge, Mean Velocity, and Cross-Sectional Area Curves. F. W. Hanna. (Abstracted from Paper presented before the Hydrographic Conf. of the U. S. Geol. Surv.) (13) Mar. 23.
Water Purifier and Softener.* (12) Mar. 24.
High-Speed Pumps with Gutermuth Valves.* (11) Mar. 24.
Water Service. (Abstract of Rept. presented before the Amer. Ry. Eng. and M. of W. Assoc.) (40) Mar. 24.
A New Form of Hydraulic Pump.* (14) Mar. 25.
The Antietam Filters of the Reading Water Works: The Second Slow Sand Plant in this City.* (14) Mar. 25.
Electric Power Transmission in the Missouri Lead Mining District.* (13) Mar. 30.
Artesian Flows from Unconfined Sandy Strata.* Myron L. Fuller. (13) Mar. 30.
The Water Supply of Country Buildings.* Wm. Paul Gerhard, M. Am. Soc. M. E. (10) Serial beginning Apr.
The Sand Filtration Plant of the Indianapolis Water Works.* W. C. Maber. (Abstract of Paper read before the Indianapolis Technical Club.) (60) Apr.
Regulating Valve.* J. W. Ledoux. (2) Apr.
The Holmes System of Water Purification.* (64) Apr.
The Torresdale Conduit.* John W. Hill. (2) Apr.
The Barossa Dam, Southern Australia.* Emile Guarini. (46) Apr. 1.
The New Gravity Water Works at Hudson, N. Y.* (14) Apr. 1.
Difficulties with a Pump Well.* (14) Apr. 1.
Method of Laying a Triple Line of 60-In. Cast-Iron Pipe.* Seth M. Van Loan. Assoc. M. Am. Soc. C. E. (13) Apr. 6.
Evaporation Observations in the United States. Herbert Harvey Kimball. (Paper read before the National Irrigation Cong.) (13) Apr. 6.
A Method of Computing Flood Discharge and Cross-Section Area of Streams.* E. C. Murphy, M. Am. Soc. C. E. (13) Apr. 6.
A Convenient Method for Determining the Discharge of Streams and Canals.* J. H. Cunningham, M. Am. Soc. C. E. (13) Apr. 6.
Les Moulinets comme Moyens d'Étudier le Régime des Cours d'Eau et Leur Emploi dans la Solution des Problèmes Hydrotechniques. W. Czarnomski. (31) Pt. 3. 1904.
Les Forces Motrices des Lacs de Joux et de l'Orbe (Suisse).* C. H. Perrin. (33) Serial beginning Feb. 25.
Les Nouveaux Barrages-Réservoirs de Solingen Comparés aux Ouvrages Analogues Construits en France.* Jacquinot. (33) Feb. 25.
Hydromechanische Einrichtungen von Neueren österreichischen Elektrizitätswerken.* Gustav Witz. (53) Feb. 24.
Die Fortschreitende Senkung des Grundwasserspiegels.* J. Gust. Richert. (53) Feb. 24.
Das Absolute Maximum des Hydraulischen Staues. B. Tolman. (53) Mar. 3.
Eine Neue Amerikanische Druckluftpumpe.* Georg v. Hanffstengel. (82) Mar. 18.
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Ueber Freigehende Pumpenventile.* L. Klein. (48) Mar. 25.

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Island Harbors and the Accumulations of Material Caused by Detached Works.* P. Vedel. (54) Vol. 54, Pt. A.

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Harbours of Great Britain. William Matthews, M. Inst. C. E. (54) Vol. 54, Pt. A.
Harbour Development in Holland.* H. Wortman. (54) Vol. 54, Pt. A.
Maritime Ports of France. *Baron* E. T. Quinette de Rochemont, M. Am. Soc. C. E. (Tr. from the French by Foster Crowell, M. Am. Soc. C. E. (54) Vol. 54, Pt. A.
The Preparation and Use of Concrete Blocks for Harbour Works.* I. Hiroi. (54) Vol. 54, Pt. A.
Concrete Blocks at Osaka Harbour Works, Japan.* S. Shima. (54) Vol. 54, Pt. A.
Harbors on Lakes Erie and Ontario.* Dan C. Kingman. (54) Vol. 54, Pt. A.
Harbors on Lake Superior, Particularly Duluth-Superior Harbor.* David DuB. Gaillard. (54) Vol. 54, Pt. A.
Seacoast Harbors in the United States.* Cassius E. Gillette. (54) Vol. 54, Pt. A.
The Delaware, Sandy Bay and San Pedro Breakwaters.* C. H. McKinstry, M. Am. Soc. C. E. (54) Vol. 54, Pt. A.
The Panama Canal. (12) Serial beginning Mar. 3.
Report of the Commission of Engineers on the Rectification of the Sacramento and San Joaquin Rivers.* (13) Mar. 9.
Sand-Pump Dredging on the Mersey.* (11) Serial beginning Mar. 10.
The Largest Coal Dock in the United States.* (22) Mar. 10; (27) Mar. 25.
Raising the Grade of Galveston: Description of a Unique Hydraulic Dredging and Filling Work.* (14) Mar. 11.
The Beaver Movable Dam.* W. H. Chadbourn, Jr., M. Am. Soc. C. E. (14) Mar. 11.
The First Connection by Precise Leveling between the Atlantic and Pacific Oceans. John F. Hayford. (13) Mar. 16.
Report on, and Progress Views of, the Panama Canal. (18) Mar. 18.
Machinery On the Panama Canal.* H. Prime Kieffer. (41) Apr.
Modern Machinery and the Panama Canal. A. W. Robinson. (9) Apr.
Panama in French Canal Times.* W. F. Dennis. (14) Apr. 1.
Les Ports et le Canal Maritime de Bruges.* M. L. Coiseau. (32) Dec.
L'Eclairage Électrique du "Kaiser Wilhelm" Canal: Rapport de Mission.* L. Grenier. (30) Feb.
Propulsion des Bateaux par le Courant.* G. Laurent. (36) Feb. 25.
Verfahren zur Herstellung von Wasserdichtigkeit im Beton.* (78) Mar. (P5695)

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AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

May 3d, 1905.—The meeting was called to order at 8.40 P. M., Vice-President E. Kuichling in the chair; Chas. Warren Hunt, Secretary, and present, also, 131 members and 22 guests.

The minutes of the meetings of April 5th and 19th, 1905, were approved as printed in the *Proceedings* for April, 1905.

A paper by R. D. Coombs, Assoc. M. Am. Soc. C. E., entitled "Round-House Framing" was presented by the Secretary. A second paper, entitled "A Few Remarks on Foundations," by L. L. Buck, M. Am. Soc. C. E., was presented by the Secretary, and discussed by Messrs. C. H. Fuller, R. P. Miller, J. P. Whiskeman, C. A. Ruggles, H. F. Dunham and H. C. Lowrie.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

George Berry, Brooklyn, N. Y.
Louis Livingston Brown, New York City.

José Antonio Canals, San Juan, Porto Rico.
Edward Ike Cantine, East Orange, N. J.
Frederick James Easterbrook, New Haven, Conn.
Hector James Hughes, Cambridge, Mass.
James Alexander Jamieson, Montreal, Que., Canada.
Henry Japp, Long Island City, N. Y.
James Barney Marsh, Des Moines, Iowa.
Lardner Vanuxem Morris, Brooklyn, N. Y.
William Nelson Page, Ansted, W. Va.
Frederic Auten Combs Perrine, New York City.
Alfred Edward Phillips, Chicago, Ill.
William Haselton Puffer, Guanajuato, Mexico.
Charles Augustus Van Keuren, Jersey City, N. J.
John Van Vleck, New York City.

As Associate Members.

Carl Lincoln Bannister, Rome, N. Y.
Carroll Blake, Brooklyn, N. Y.
John Potter Congdon, Pocatello, Idaho.
Keith Osmond Guthrie, Brooklyn, N. Y.
Charles Edward Howe, Wabash, Ind.
Harold Walton Hudson, Harrisburg, Pa.
Edward Clinton Jansen, Shanghai, China.
Boudinot Gage Leake, Fort Worth, Tex.
Walter Raleigh Lewis, Jr., Littleton, Colo.
Carlos Lobo, Brooklyn, N. Y.
Elbert Emerson Lochridge, Springfield, Mass.
Ernest Manchester, Melbourne, Australia.
Arthur Edmund Owen, Jersey City, N. J.
Herbert Lincoln Rogers, New York City.
Fred Winton Sarr, Syracuse, N. Y.
James Eaton Tórrey, Montclair, N. J.
Richard William Tull, Philadelphia, Pa.
William Preston Wooten, Washington, D. C.

As Associates.

Samuel Fischer Miller, New York City.
Charles Louis Spier, New York City.

The Secretary announced:

The transfer of the following candidates, by the Board of Direction, on May 2d, 1905:

From Associate Member to Member.

Alfred Douglas Flinn, New York City.
John Flynn, Jr., Troy, N. Y.
Charles Wellford Leavitt, Jr., New York City.
Edson Mason Scofield, Philadelphia, Pa.
Henry Felix Wilson, Jr., Birmingham, Ala.

The election of the following candidates, by the Board of Direction:

As Juniors.

On February 28th, 1905.

Joseph Carl Schaeffler, Somerville, Mass.

On April 4th, 1905.

Arthur Clarence Tozzer, New York City.

On May 2d, 1905.

Ernest Stearns Ball, New York City.
John Clyde Fruit, New York City.
Linn Murdoch Huntington, Culebra, Canal Zone, Panama.
Harry George Raschbacher, Washington, D. C.
Carl Howell Reeves, Seattle, Wash.
Albert Orange Smith, Livingston Manor, N. Y.
Roy Adolf Swartwout, Tecumseh, Nebr.

The Secretary announced the following death:

Shukichi Fujino, elected Junior February 3d, 1903; date of death unknown.

Adjourned.

May 17th, 1905.—The meeting was called to order at 8.30 p. m.; President C. C. Schneider in the chair; Assistant Secretary T. J. McMinn acting as Secretary; and present, also, 122 members and 32 guests.

A paper, by F. E. Trask, M. Am. Soc. C. E., entitled "The Irrigation System of Ontario, California—Its Development and Cost," was presented by the Acting Secretary.

G. B. Francis, M. Am. Soc. C. E., gave a description of "The Hydro-electric Development for the Atlanta Water and Electric Power Company, on the Chattahoochee River, near Atlanta, Ga.," illustrated with lantern slides, and the subject was discussed by Messrs. John Bogart, Wm. B. Parsons, Cary T. Hutchinson and G. B. Francis.

An oil painting of the late George S. Morison, Past-President, Am. Soc. C. E., was presented to the Society by William Barclay Parsons, M. Am. Soc. C. E., on behalf of certain of his friends who had subscribed to its cost.

The Acting Secretary announced the following deaths:

William Smith Morison, elected Associate Member April 6th, 1904; died May 1st, 1905.

Edmund Trowbridge Dana Myers, elected Member May 2d, 1888; died May 12th, 1905.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

April 20th, 1905.—A Special Meeting, for the consideration of tenders for the alterations and additions to the Society building, was held at 8.30 P. M., President Schneider in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Bowman, Craven, Davison, Deyo, Ellis, Knap, Landreth, N. P. Lewis, Noble, and Osgood.

Five tenders were received.

The President and Secretary were authorized to execute a contract with any of these bidders after having secured the approval of the Building Committee, and the Treasurer was authorized to make all necessary payments under such contract after they had been certified by the architect, and approved by the Building Committee.

Adjourned.

May 2d, 1905.—President Schneider in the chair; Chas. Warren Hunt, Secretary, and present, also, Messrs. Bissell, Bowman, Craven, Deyo, Gowen, Knap, Kuichling, N. P. Lewis, Noble, Osgood, Sherrerd and Webster.

Mr. Noble, Chairman of the Building Committee, reported that that Committee had approved the award of a contract for the addition to, and alterations of, the present House of the Society, to William L. Crow, the lowest bidder, the total amount of the contract being Fifty-two thousand four hundred and ninety-seven dollars ($52,497).

A report of the Board of Direction, for presentation to the Society at the next Annual Convention, in the matter of resolutions referred to the Board by the last Annual Meeting, was adopted.

Applications were considered, and other routine business transacted.

Five Associate Members were transferred to Member, and seven candidates for Junior were elected.

Adjourned.

Correction of Abstract of Minutes of the Meeting of the Board of Direction of April 4th, 1905:

In the third line, page 174 (April *Proceedings*) strike out "Craven" and insert "Croes."

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, June 7th, 1905.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and two papers will be presented for discussion, as follows: "A Few Points in the Design of Reinforced Concrete Arches," by B. R. Leffler, Assoc. M. Am. Soc. C. E., and "Theory of the Spherical or Conical Dome of Reinforced Concrete or Metal," by William Cain, M. Am. Soc. C. E.

Both these papers were printed in *Proceedings* for April, 1905.

Wednesday, September 6th, 1905.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, by Edwin H. Warner, M. Am. Soc. C. E., entitled "The Hydraulic Plant of the Puget Sound Power Company," will be presented for discussion.

This paper is printed in this number of *Proceedings*.

Wednesday, September 20th, 1905.—8.30 P. M.—At this meeting a paper entitled "Notes on the Improvement of River and Harbor Outlets in the United States," by D. A. Watt, M. Am. Soc. C. E. will be presented for discussion.

This paper is printed in this number of *Proceedings*.

ANNUAL CONVENTION.

The Thirty-Seventh Annual Convention will be held in Cleveland, Ohio, June 20th-23d, 1905. The following Committees have been appointed to take charge of the arrangements:

COMMITTEE OF THE BOARD OF DIRECTION:

ALFRED CRAVEN, *Chairman;*

N. P. LEWIS, CHARLES S. GOWEN,
W. J. WILGUS, CHAS. WARREN HUNT.

LOCAL COMMITTEE:

A. MORDECAI, *Chairman;*

WM. J. CARTER, F. C. OSBORN,
HARRY FULLER, W. P. RICE,
E. A. HANDY, J. RITCHIE,
A. M. JOHNSTON, W. H. SEARLES,
M. W. KINGSLEY, S. T. WELLMAN,
J. FRANCIS LE BARON, C. H. WRIGHT.

Application for special rates has been made to the Railway Passenger Association, and a Programme is being arranged. As soon as these details have been perfected, a circular will be mailed to all members of the Society.

PRIVILEGES OF LOCAL SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

The Boston Society of Civil Engineers will welcome any member of the American Society of Civil Engineers at its library and reading room, 517 Tremont Temple, Boston, which is open on week days from 9 A. M. to 5 P. M. Members will also be welcome at the meetings, which are held in the same building, on the evenings of the fourth Wednesday in January, and the third Wednesdays of other months, except July and August.

The rooms of **The St. Louis Engineers' Club** are in the business center of St. Louis, and visiting engineers are cordially invited to use them for mail, telephone service, information, etc.

The courtesies of **The Engineers' Society of Western Pennsylvania** have been extended to members of the American Society of Civil Engineers. The rooms of the Society, 410 Penn Ave., Pittsburg, Pa., are open at all times, and meetings are held as follows, except during July and August. REGULAR SECTION, Third Tuesdays; CHEMICAL SECTION, Thursdays following third Tuesdays; MECHANICAL SECTION, First Tuesdays; STRUCTURAL SECTION, Fourth Tuesdays.

The Western Society of Engineers, Monadnock Block, Chicago, Ill., tenders to members of this Society the use of its rooms and facilities, together with the good offices of its Secretary and of a special committee appointed for that purpose.

The Civil Engineers' Club of Cleveland, Ohio, invites members of this Society to make use of the Club rooms, at any time when in Cleveland. Cards will be furnished on application to the Secretary, Mr. J. C. Beardsley.

The Engineers' Club of Central Pennsylvania has established new quarters at the corner of Second and Walnut Streets, Harrisburg, Pa., and desires to extend the courtesies of the Club to visiting members of the American Society of Civil Engineers.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

INTERNATIONAL ENGINEERING CONGRESS PUBLICATIONS.

The six volumes of the Proceedings of the International Engineering Congress have been printed and five of them have been distributed to all Members elected prior to December 31st, 1904. Members elected subsequent to December 31st, 1904, who wish to secure these volumes may obtain them on payment of 50% of the price, which is $5.00 per volume.

These six volumes have been issued as Parts A, B, C, D, E and F of Vol. LIV of *Transactions*. The notation, as Parts of one of the regular volumes of *Transactions,* was adopted for the convenience of Members, so that when all are received they will be consecutive on the shelf. It was not possible at the time to say how long it would take to collate the discussions and issue these volumes, and it was thought best to issue them as Parts of Vol. LIV. This explanation is given so that the membership may understand that, for them, there will be seven Parts of Vol. LIV, and that the regular Volume, whose shelf place should be first, will not be published until after these Engineering Congress Publications.

ADDITION TO SOCIETY HOUSE.

On June 6th, 1904, a lot immediately adjoining the Society House was purchased. This lot has a frontage of 25 ft. and an average depth of 116 ft.

The following Building Committee was appointed: Alfred Noble, Chairman; S. L. F. Deyo, N. P. Lewis and Chas. Warren Hunt, and plans for an addition, including some alterations in the present house, have been made by Eidlitz and McKenzie, Architects,

under the direction of this Committee, which were approved by the Board of Direction on April 5th, 1905, and on May 2d, 1905, a contract for the work was signed with Wm. L. Crow.

The contract calls for a building practically covering the entire new lot, of the same height as the present house, thus adding 50% to its capacity. The quality of work is to be in all respects similar to that of the old house.

The alterations will consist in remodeling the first floor, making a large Reception Hall, improving the entrance to the Lounging Room, enlarging the General Toilet Room, etc.

The plans also call for a stairway in the rear, furnishing direct communication between the Lounging Room on the first and the Auditorium on the second floor. These two rooms will be 50% larger than at present, the seating capacity of the Auditorium being increased from 400 to 600. The plans are so arranged that a large increase in space for office or library work can be readily made whenever required in the future, without altering the front part of the building.

The property of the Society now consists of a plot, the general dimensions of which are:

Frontage on Fifty-seventh Street.....	75 ft.
Depth on the east line.....	107 "
" " " west line	118 "
Total area	8 437 sq. ft.

Building operations have already been begun by the contractor, and it is hoped to have the building so far advanced that the first fall meeting (September 6th, 1905) may be held in the new Auditorium.

LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

The subject of the formation of Local Associations of the membership of the Society has been set down for discussion at the Annual Convention at Cleveland, and the present state of the matter is given below for the information of Members.

The following circular note, enclosing suggested By-Laws, was mailed March 7th, 1905, to at least three Members of the Society in each of the following cities, with a request that the suggestion be brought to the attention of Members in their vicinity.

Albany and Troy, N. Y.	New Orleans, La.
Boston, Mass.	Philadelphia, Pa.
Cleveland, Ohio.	Pittsburg, Pa.
Chicago, Ill.	St. Louis, Mo.
Detroit, Mich.	St. Paul and Minneapolis, Minn.
Kansas City, Mo.	San Francisco, Cal.
Mexico, Mexico.	Washington, D. C.

Views of the Board of Direction as to the Formation of Local Associations of Members of the American Society of Civil Engineers, March, 1905.

The proposed formation of a Local Association of the Membership of the Society in Washington, D. C., has led the Board to a careful consideration of the desirability of such Associations in all localities in which the membership available for such purpose is sufficient in number.

The subject of the formation of local chapters of the Society was considered a number of years ago, but nothing was accomplished in this direction, as there developed considerable opposition to the formation of such chapters.

The present suggestion is understood to have a somewhat different end in view, *viz.*, the formation of local associations of our members for professional and social intercourse only. Similar propositions have been considered somewhat informally by the Board of Direction heretofore, one emanating from members residing in the City of Mexico, and another from St. Louis, although the latter proposition was merely the decision of the question as to whether the present local engineering society of St. Louis could be furnished, upon request, with certain of the Society publications, and allowed to discuss them with the privilege of having such discussion, if valuable, published by the Society. This latter question was decided by the Board in the affirmative, but nothing further has been heard from our members in that city.

The Board recommends that, wherever possible, steps be taken calling the attention of the membership to this matter, and that such Associations be formed.

In making this recommendation, the Board wishes to point out that associations of this character would be of great advantage to the Profession in general, and would widen greatly the influence of this Society, and enhance its standing in the various communities; that if coincidentally (or practically so) the papers issued in our *Proceedings* could be brought up for discussion at meetings in various localities and the resulting discussion forwarded to the Secretary of the Society for publication, subject to the rules in force in regard to the discussions which now take place in New York, it would result in great advantage to the *Transactions*, and that, in nearly all cases, it would be possible for the author of a paper published by the Society to be within reasonable traveling distance of some point at which his paper is to be read, and give him an opportunity to present it in person.

It is further believed that if this project can be carried out successfully, it would bring non-resident members into closer touch with all the work of the Society, and place the non-resident member practically in the position of a resident member of the Society in the particular locality in which he lives.

It is further submitted that the advantages to engineers who are not now members of the Society would be very great, and that the formation of such an association in any city would not interfere in any way with existing local engineering societies or clubs.

The Board has prepared a draft of proposed By-Laws for such an association (copy enclosed herewith), which, in its opinion, would be satisfactory.

Referring to this draft, it is believed that the following Articles: No. 1, relating to the Name, Location and Object; No. 2, relating to Membership, and No. 6, relating to Amendments, should in substance be incorporated in the By-Laws of all such associations, but that Article No. 3, relating to Dues; No. 4, relating to Officers, and No. 5, relating to Meetings, may all be varied in detail according to special local requirements or convenience.

These are inserted in the draft as suggestions for consideration in each special case, although it would be well if, in all matters except the amount of dues, all such associations had exactly similar By-Laws.

In this connection it should be noted that the Resident Membership of the Society pays an additional fee of $10 per annum for the special privileges of such membership, and that a much less yearly sum would probably suffice for the dues in Local Associations as outlined herein.

By order of the Board of Direction.
CHAS. WARREN HUNT,
Secretary.

PROPOSED BY-LAWS FOR LOCAL ASSOCIATIONS.

ART. I. NAME, LOCATION AND OBJECT.

(1) The name of this Association shall be the ..... Association of Members of the American Society of Civil Engineers.

(2) The offices of the Association shall be located in the City of .....

(3) Its objects shall be the advancement of engineering knowledge and practice, the maintenance of a high professional standing among its members, and the furtherance of the general welfare of the American Society of Civil Engineers.

(4) Among the means to be employed for these purposes shall be: Meetings for the presentation and discussion of professional papers, particularly those issued by the American Society of Civil Engineers, and the encouragement of engineers who are not members to attend and take part in the professional and social features of such meetings.

ART. II. MEMBERSHIP.

(1) The membership of this Association shall be restricted to persons who are members of the American Society of Civil Engineers in any grade and who reside within .... miles of ..... All such may become members of this Association without payment of Entrance Fee, but should the membership in the American Society of Civil Engineers of any person cease from any cause, he shall at the same time cease to be a Member of this Association.

ART. III. DUES.

(1) The annual dues payable by all members shall be ....., payable semi-annually in advance on the first days of January and

July, and any member whose dues are more than six months in arrears shall cease to be a Member of this Association.

ART. IV. OFFICERS.

(1) The officers of the Association shall be a President, two Vice-Presidents, a Secretary, and a Treasurer, who shall constitute a Board of Directors, in which the government of the Association shall be vested.

(2) The term of office of the President of the Association shall be one year; of the Vice-Presidents, Secretary and Treasurer, two years. The term of each officer shall begin at the close of the Annual Meeting at which such officer is elected, and shall continue for the period above named, or until a successor is duly elected.

(3) A vacancy in any office shall be filled by election at the next regular meeting of the Association.

(4) The officers shall be elected at the Annual Meeting of the Association.

ART. V. MEETINGS.

(1) The Annual Meeting of the Association shall be held on the third Wednesday of December in each year.

(2) Regular meetings shall be held monthly, except during the summer months, at such time and place as may be appointed by the Board of Directors. At these meetings the business of the Association shall be transacted, and the discussion of professional papers published by the American Society of Civil Engineers, or specially prepared for the occasion, shall be in order. Such discussions may be furnished to the Secretary of the American Society of Civil Engineers for publication, subject to the approval of the Publication Committee of that Society.

ART. VI. AMENDMENTS.

(1) This Constitution may be amended only by a two-thirds vote of all members of the Association, which vote may be taken, if necessary, by letter-ballot, provided such amendment shall have previously received the approval of the Board of Direction of the American Society of Civil Engineers.

The subject seems to have aroused great interest among the Members of the Society generally, and two Local Associations have already been formed.

Kansas City, Mo.—The Kansas City Association of Members of the American Society of Civil Engineers was organized on April 8th, 1905, the following officers being elected:

President, Daniel Bontecou.

Vice-Presidents, I. G. Hedrick, S. W. Fox.

Secretary and Treasurer, C. S. Burns.

The membership is limited to the membership of the Society residing within 100 miles of Kansas City; the annual dues are not to exceed $10; meetings are to be held monthly, except during June, July and August.

San Francisco, Cal.—The San Francisco Association of Members of the American Society of Civil Engineers was organized on April 28th, 1905, the following officers being elected:

President, Captain Wm. W. Harts.

Vice-Presidents, G. E. Gray, C. D. Marx.

Secretary, F. Riffle.

Treasurer, A. L. Adams.

To a circular letter, which was addressed to 79 members living within 100 miles of San Francisco, by Captain Harts, 55 replies were received, all but two of which were favorable to the organization; 29 members were present at the meeting of April 28th, and it is stated by the President that there was considerable enthusiasm manifested. The 100-mile limit for membership was adopted; dues were fixed at not more than $5 per year. The Annual Meeting is to be held on the third Wednesday of December of each year, and regular meetings are to be held bi-monthly.

Washington, D. C.—In this city, where this movement started, there has been much discussion of the subject, but no decision has been reached.

Cleveland, Ohio.—The matter is still under consideration, the reports at present indicate favorable action by our members in that vicinity; the sense of a meeting held on April 11th, 1905, at which 15 were present, was expressed that such an association would be desirable.

Philadelphia, Pa.—The matter is to be submitted to letter-ballot of the local membership.

Pittsburg, Pa.—It was the intention to have a meeting for the consideration of this matter on May 10th, but, upon the understanding that the whole question would be discussed at the Convention, action has been deferred.

Boston, Mass.—The statement is made that it is the unanimous opinion of those who have been consulted that it would be very difficult to arouse sufficient enthusiasm in Boston and vicinity to result in such an organization.

St. Louis, Mo.—At a meeting of the St. Louis members, held on March 24th, 1905, a resolution was adopted to the effect that it is not desirable at this time to have such an organization in St. Louis. There were 23 members present. There is now a local organization of our members, which has, to date, held 26 meetings, but has never met for the purpose of reading or discussing technical papers, but only for the discussion of business matters in connection with the National Society.

There has been more or less correspondence with members in the other cities to whom the suggestion was sent, but nothing definite has been decided.

ACCESSIONS TO THE LIBRARY.

From April 12th to May 9th, 1905.

DONATIONS.*

FABRICATION DE L'ACIER.

Par H. Noble. Paper, 10 x 6 in., illus., 7 + 603 pp. Paris, Vve. Ch. Dunod. 26 francs, 50 centimes.

The preface states that this work gives first, in a condensed form, the properties of iron; especially applied in iron and steel work; then the different processes of manufacturing bars of steel, for the rolling mill and the forge, are minutely studied from the theoretical and especially the practical point of view. The study of methods of manufacture is made from the side of the metal and also of the accessory materials and preparation. It is intended to be a complete guide to the overseer and engineer in charge of steel works. The last chapter describes the organization of the working force, also technical bookkeeping; this includes not only the cost and returns for the bar of steel but also for the different intermediary conditions of the metal. Various usages are given, and the numerous examples are chosen from the arrangements that are the best known and the most complete. There is an index of about ten pages.

DIE FORMELZEICHEN.

Ein Beitrag zur Lösung der Frage der algebräischen Bezeichnung der physikalischen, technischen und chemischen Grössen. Von Olof Linders. Paper, 11 x 7 in., 96 pp. Leipzig, Jäh & Schunke, 1905.

Since the appearance of his book "Die physikalischen Grössen," the author states that the interest in the question of signs has grown so great that it might now be attempted to treat the matter further in a separate volume, and this is the reason for this little book, in which he adds three more propositions as a contribution to the solution of this most important, but very difficult question. He has at the same time inserted for comparison the signs occurring in several of the much-used technical handbooks, and, moreover, as far as space permitted, some of the most important sign propositions so far known. The chief feature of the book is a large table giving 871 quantities used in physics, electricity, chemistry, etc., each followed by the various letter symbols proposed to represent it.

DESCRIPTIVE GEOMETRY FOR STUDENTS OF ENGINEERING.

By James Ambrose Moyer. Second edition. Cloth, 9 x 6, illus., 8 + 198 pp. New York, John Wiley & Sons, 1905. $2.

The preface states that the aim of this book is to present the subject so as to make it most easily applicable to the requirements of recent engineering practice. It is alleged that the methods of presentation, therefore, are not traditional. Experience has shown that most students in our best technical schools have difficulty in applying their knowledge of this subject to subsequent work in structural and machine design. Two things have been attempted to overcome this failure; the notation is essentially the same as that used in mechanical drawing, and many concrete exercises, showing usual practical applications have been inserted. The data for the exercises are stated by the system of coördinates used in analytic geometry; a large number of perspective and orthographic drawings have been inserted.

Gifts have also been received from the following:

Albany, N. Y.—R. R. Commrs. 2 bound vol.
Am. Assoc. 1 pam.
Am. Ry. Assoc. 1 pam.
Assoc. Propriétaires d'Appareils à Vapeur. 1 vol.
Augusta, Ga.—Mayor. 1 pam.
Bates, L. W. 1 pam.
Brockton, Mass.—Water Commrs. 1 pam.
Brooklyn Engrs.' Club. 1 bound vol.
Burlington, Vt.—City Clerk. 1 pam.
Byllesby, H. M., & Co. 1 bound vol.
Canada—Dept. of Marine and Fisheries. 1 pam.
Canada—Dept. of Rys. & Canals. 1 vol.
Canadian Min. Inst. 2 vol., 1 pam.
Colo.—Agri. Exper. Station. 4 pam.
Fisk, W. L. 1 vol.

* Unless otherwise specified, books in this list have been donated by the publishers.

France—Ministère de Travaux Publics. 1 pam.
Gloversville, N. Y.—Water Board. 1 pam.
Great Brit.—Patent Office. 13 pam., 4 vol.
Hale, H. E. 1 bound vol.
Harrington, J. L. 1 bound vol.
Hartford—Board of Street Commrs. 1 pam.
Hill, C. R. 1 bound vol.
Hill, J. W. 1 pam.
Holyoke, Mass.—City Engr. 1 pam.
Inst. of Mech. Engrs. 1 vol.
Iowa Eng. Soc. 1 pam.
Mass.—Bureau of Labor. 1 bound vol.
Met. Park Com. 2 bound vol.
Mich.—State Board of Health. 3 pam.
Mich. Central R. R. Co. 1 pam.
Miss. River Comm. 1 pam.
New Jersey—Commr. of Public Roads. 1 vol.
New York Central & Hudson River R. R. Co. 1 pam.
New York, Chicago & St. Louis R. R. Co. 1 pam.
Nicholson, G. B. 1 pam.
Northampton, Mass.—Water Commrs. 1 pam.
Ontario—Provincial Board of Health. 1 pam.
Paine, Charles. 2 vol.
Permanent Inter. Assoc. of Navigation Cong. 1 vol.
Providence, R. I.—R. R. Commr. 1 bound vol.
Reform Club, 9 bound vol. 2 vol., 20 pam.
Rhode Island—Board of Public Roads. 1 bound vol.
Rose Polytechnic Inst. 1 vol.
Royal Soc. of New South Wales. 1 vol.
Schenectady, N. Y.—City Engr. 2 pam.
Shanghai, China—Mun. Council. 1 vol.
Soc. Belge des Ingenieurs et des Industriels. 2 pam.
Soc. des Ingenieurs Civ. de France. 1 vol.
Soper, G. A. 1 pam.
Taunton, Mass.—Water Dept. 1 pam.
Texas—R. R. Comm. 1 vol.
Thayer, Russel. 1 pam.
Unknown. 8 pam.
U. S. Bureau of Education. 1 bound vol.
U. S. Bureau of Forestry. 1 bound vol.
U. S. Bureau of Statistics. 1 bound vol., 1 vol., 1 pam.
U. S. Bureau of the Census. 1 bound vol.
U. S. Geol. Surv. 4 pam.
U. S. Interstate Commerce Comm. 4 pam.
U. S. War Dept. 15 Specif.
Univ. of Ill. 3 pam.
Univ. of Mich. 1 pam.
Univ. of Wis. 1 bound vol.
Van Sandick, R. A. 1 pam.
Vernon-Harcourt, L. F. 2 pam.

BY PURCHASE.

Manuel Pratique des Moteurs a Gaz et Gazogenes. Par R. E. Mathot. Paris, Ch. Béranger, 1904.

Die deutschen Städte. Von Robert Wuttke. Band 1–2. Leipzig, Freidrich Brandstetter, 1904.

Problems of the Panama Canal. By Henry L. Abbot. New York, The Macmillan Company, 1905.

Tables for Roof Framing, etc. Revised and extended with Logarithms of 32ds from zero to 60 feet; Sines, Tangents, etc., for Draughtsmen. By G. D. Inskip, Philadelphia, 1904.

A Manual of Mining. Based on the Course of Lectures on Mining, Delivered at the School of Mines of the State of Colorado. By M. C. Ihlseng and Eugene B. Wilson. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1905.

Modern Civic Art; or, The City Made Beautiful. By Charles Mulford Robinson. G. P. Putnam's Sons, New York and London, 1904.

The Art of Generating Gear-Teeth. By Howard A. Coombs. New York, D. Van Nostrand Company, 1904.

Generator-Kraftgas- und Dampfkessel-Betrieb, in Bezug auf Wärmeerzeugung und Wärmeverwendung. Eine Darstellung der Vorgänge, der Untersuchungs- und Kontrollmethoden bei der Umfor-

mung von Brennstoffen für den Generator-Kraftgas- und Dampfkessel-Betrieb. Von Paul Fuchs. Berlin, Julius Springer, 1905.

Die Steuerungen der Dampfmaschinen. Von Carl Leist. Berlin, Julius Springer, 1905.

SUMMARY OF ACCESSIONS.

April 12th to May 9th, 1905.

Donations (including 7 duplicates)	158
By purchase	9
Total	167

MEMBERSHIP.

ADDITIONS.

MEMBERS.

		Date of Membership.
BERRY, GEORGE. 78 Morton St., Brooklyn, N. Y.		May 3, 1905
DAVENPORT, JAMES AUBREY. 418 Third St., S. W., Roanoke, Va.		April 5, 1905
DOBLE, WILLIAM ASHTON. 200 Fremont St., San Francisco, Cal.		April 5, 1905
EASTERBROOK, FREDERICK JAMES. 82 York Sq., New Haven, Conn.		May 3, 1905
ENDO, TOKICHI. Chf. Engr., Nankai Ry. Co., Osaka, Japan.		Feb. 1, 1905
FLINN, ALFRED DOUGLAS. Gen. Insp., Aqueduct Commrs., 280 Broadway, New York City.	Assoc. M. M.	Dec. 6, 1899 May 2, 1905
FLYNN, JOHN, Jr. Civ. and Elec. Engr.; City Engr., 83 Third St., Troy, N. Y.	Assoc. M. M.	Jan. 8, 1902 May 2, 1905
GUNN, WILLIAM EDWARD. City Engr., Covington, Ky.		April 5, 1905
JAMIESON, JAMES ALEXANDER. Cons. and Designing Engr., Board of Trade Bldg., Montreal, Que., Canada		May 3, 1905
JAPP, HENRY. Managing Engr. and Director, S. Pearson & Son, Inc., Long Island City, N. Y.		May 3, 1905
LEAVITT, CHARLES WELLFORD, Jr. Civ. and Landscape Engr., 15 Cortlandt St., New York City.	Assoc. M. M.	Jan. 4, 1898 May 2, 1905
MEEM, JAMES COWAN. Chf. Engr. for Cranford & McNamee, 52 Ninth St. (Res., 177 Woodruff Ave.), Brooklyn, N. Y.	Assoc. M. M.	April 1, 1896 April 4, 1905
MOORE, JOHN EDWIN. 1121 The Rookery, Chicago, Ill.		Oct. 5, 1904
SCOFIELD, EDSON MASON. Pres. and Chf. Engr., The Scofield Co., Cons. and Contr. Engrs., Pennsylvania Bldg., Philadelphia, Pa.	Assoc. M. M.	April 1, 1896 May 2, 1905
SEWELL, JOHN STEPHEN. Capt., Corps of Engrs., U. S. A., P. O. Box 455, Washington, D. C.		April 5, 1905
VAN KEUREN, CHARLES AUGUSTUS. Chf. Engr., Municipality of Jersey City, 53 Clinton Ave., Jersey City, N. J.		May 3, 1905

ASSOCIATE MEMBERS.

BANNISTER, CARL LINCOLN. Barge Canal Office, Rome, N. Y.		May 3, 1905
BLAKE, CARROLL. 154 Eightieth St., Brooklyn, N. Y.		May 3, 1905

		Date of Membership.
BRUSH, WILLIAM WHITLOCK. Asst. Engr., Dept. of Water Supply, Gas and Electricity, Room 41, Municipal Bldg., Brooklyn, N. Y.	Jun.	Mar. 3, 1896
	Assoc. M.	April 5, 1905
DATER, PHILIP HERRICK. Asst. Engr., Barge Canal Office, DeGraaf Bldg. (Res., 116 Lancaster St.), Albany, N. Y.		April 5, 1905
FINLEY, EDWIN CLIFFORD. 523 Chemical Bldg., St. Louis, Mo.		April 5, 1905
GETMAN, FRANK LAWTON. 14 Catherine St., Lyons, N. Y.		April 5, 1905
GUTHRIE, KEITH OSMOND. 434 Greene Ave., Brooklyn, N. Y.		May 3, 1905
HANEY, LEWIS TUSTLER. 369 Ocean Ave., Brooklyn, N. Y.	Jun.	Oct. 7, 1902
	Assoc. M.	Mar. 1, 1905
HERRING, JEROME CAMPBELL. City Engr., Jefferson City, Mo.		April 5, 1905
HUDSON, HAROLD WALTON. 826 North 3d St., Harrisburg, Pa.		May 3, 1905
LAVALLE, LOUIS RALPH. With Arthur Koppel, Ltd., P. O. Box 3256, Johannesburg, South Africa.		Feb. 1, 1905
LOBO, CARLOS. 441 Third St., Brooklyn, N. Y.		May 3, 1905
LOCHRIDGE, ELBERT EMERSON. Engr., Water Dept., 43 Bridge St., Springfield, Mass.		May 3, 1905
ROBERTS, SHELBY SAUFLEY. Roadmaster and Asst. Engr., Louisville Terminals, L. & N. R. R. (Res., 1604 Second St.), Louisville, Ky.		April 5, 1905
SEARLE, CHARLES DEPEW. Asst. Engr., Rapid Transit Comm., 40 West 127th St., New York City.		April 5, 1905
TORREY, JAMES EATON. Asst. Engr., C. R. R. of N. J., Jersey City, N. J.		May 3, 1905
TULL, RICHARD WILLIAM. Asst. Engr. in office of C. C. Schneider, 15th and Chestnut Sts., Philadelphia, Pa.		May 3, 1905
WALTERS, HENRY RADCLYFFE ST. ARVANS. Prin. Asst. Engr. and Chf. Draftsman, Guerber Eng. Co. (Res., 211 South New St.), Bethlehem, Pa.	Jun.	Oct. 6, 1903
	Assoc. M.	April 5, 1905
WOOTEN, WILLIAM PRESTON. Capt., Corps of Engrs., U. S. A., 2728 Pennsylvania Ave., Washington, D. C.		May 3, 1905
WRENTMORE, CLARENCE GEORGE. Asst. Prof. of Civ. Eng., Univ. of Mich., Ann Arbor, Mich.		April 5, 1905

ASSOCIATES.

QUILTY, THOMAS FRANK. Care, John J. O'Heron & Co., 6 Wabash Ave., Chicago, Ill.		April 5, 1905
SCRIBNER, GILBERT HILTON, Jr. 440 Chestnut St., Chicago, Ill.		April 5, 1905
SPIER, CHARLES LOUIS. 26 Broadway, New York City.		May 3, 1905

JUNIORS.

	Date of Membership.
Ball, Ernest Stearns. 202 West 81st St., New York City	May 2, 1905
Barnard, Elmer Ellsworth. 414 Fifth Ave., Lynchburg, Va	Jan. 31, 1905
Doty, Arden Duane. 35 Warren St., New York City	April 4, 1905
Fisher, Wilbur Howard. 158 Market St., Hannibal, Mo.	Dec. 6, 1904
Hunter, Thomas Benton. Res. Engr., Pacific Impvt. Co.'s Water Works, Monterey, Cal	April 4, 1905
Lewis, Samuel James. Care, U. S. Geological Survey, Hydrographic Branch, Washington, D. C	Dec. 6, 1904
Lydston, Walter Edward. Asst. Engr., Lehigh Val. R. R., 12 James St., Auburn, N. Y	April 4, 1905
Owens, James Michael. Dept. of Public Works, City Hall, San Francisco, Cal	April 4, 1905
Schaeffler, Joseph Carl. 49 Laurel St., Somerville, Mass	Feb. 28, 1905
Whitaker, William Franklin. Box 252, Bakersfield, Cal	April 4, 1905
Wilson, James Arthur. 205 Park Pl., Brooklyn, N. Y	Sept. 6, 1904

CHANGES OF ADDRESS.

MEMBERS.

Ashmead, Frank Milligan. Engr., R. of W., B. & A. V. Div., P. R. R., 433 Norwood Ave., Buffalo, N. Y.

Bixby, William Herbert. Col., Corps of Engrs., U. S. A., Room 508, Federal Bldg., Chicago, Ill.

Bonzano, Maximilian Ferdinand. Gen. Mgr., Chapman Iron, Coal & Coke Co., Goshen, Va.

Conkling, Cloud Clifford. Cons. Civ. Engr., 834 Ellicott Sq., Buffalo, N. Y.

Cosby, Spencer. Capt., Corps of Engrs., U. S. A., Care, War Dept., Washington, D. C.

DeWitt, Philip Hoffecker. Weatherly, Pa.

Dunn, Daniel Burke. Div. Engr., Constr., Atlanta & Birmingham Air Line Ry., 29 E. Harris St., Atlanta, Ga.

Ernst, Oswald Herbert. Col., Corps of Engrs., U. S. A.; Pres., Mississippi River Comm.; Mem., International Waterways Comm.; Mem., Isthmian Canal Comm.; Room 328, Mills Bldg., Washington, D. C.

Farrington, Harvey. Cons. and Contr. Engr., 45 Broadway, New York City.

Grunsky, Carl Ewald. Cons. Engr., Reclamation Service, U. S. Geological Survey, Washington, D. C.

Hall, William McLaurine. Union Trust Bldg., Parkersburg, W. Va.

Hayes, Edmund. 816 Fidelity Bldg., Buffalo, N. Y.

Hazard, Schuyler. 24 South Broadway, White Plains, N. Y.

Hoff, Olaf. Vice-Pres., Butler Bros. Constr. Co., 1170 Broadway, New York City.

Hoffman, Nathaniel Baker Klink. Asst. Engr., Dept. of Sewers (Res., 2683 Creston Ave.), Bronx, New York City.

Holbrook, Elliot. 1305 Date St., San Diego, Cal.

Hughes, William Mackenzie. Cons. Bridge Engr., 280 La Salle St., Room 929, Chicago, Ill.

Jenkins, William Dunbar. Representing The Simplex Concrete Piling Co., 3400 Disston St., Tacony Station, Philadelphia, Pa.

Kerr, Luther Yager. U. S. Junior Engr., P. O. Box 404, Vicksburg, Miss.

Kondo, Sentaro. Naimusho Tokio Doboku Shitchojo, Japan.

Leland, Warren Allston. U. S. Asst. Engr., Room S 7, Army Bldg., New York City.

Lilly, George Washington. 606 Marquam Bldg., Portland, Ore.

Look, Moses Jerome. Div. Engr., Met. Water and Sewerage Board, Oakdale, Mass.

Maltby, Frank Bierce. Div. Engr., in Chg. of Dredging Operations, Isthmian Canal Comm., Cristobal, Canal Zone, Panama.

Mogensen, Olaf Einar. Engr., F. L. Smidth & Co., 41 Cortlandt St., New York City.

Moody, Burdett. Cons. Engr., 1019 Beacon St., Los Angeles, Cal.

Mosman, Alonzo Tyler. Asst., U. S. Coast and Geodetic Survey, 186 Remsen St., Room 24, Brooklyn, N. Y.

Murakami, Kyoichi. Kitahama, Osaka, Japan.

Perkins, Edmund Taylor. Engr., Reclamation Service, U. S. Geological Survey, 1108 Braly Bldg., Los Angeles, Cal.

Pierce, Henry. Engr., Constr., C. & O. Ry., Richmond, Va.

Sims, Alfred Varley. Gen. Mgr., The Cuba Eastern R. R. Co., Guantanamo, Cuba.

Snyder, George Duncan. Prin. Asst. Engr., Hudson Companies, 111 Broadway, New York City.

Taylor, Charles Frederick. Engr. and Contr., 78 Broad St., New York City.

Todd, Frank Herbert. Civ. and Hydr. Engr., Box 868, El Paso, Tex.

Turner, Nathaniel. Matehuala, S. L. P., Mexico.

Tutwiler, Thomas Henry. Vice-Pres. and Gen. Mgr., Memphis St. Ry. Co., Memphis, Tenn.

Williamson, Sydney Bacon. Cons. Engr., Calvert Bldg., Baltimore, Md.

Woolley, Andrew Feaster. Chf. Engr., Am. Banana Co., Care, Adolf Dolder & Co., Bocas del Toro, Panama.

Worthington, Charles. Cons. Engr., 715 S. Negley Ave., Pittsburg, Pa.

Zollinger, Luther Reese. Prin. Asst. Engr., P. R. R. Div., P. R. R. Co., Fifty-first St. and Wynnefield Ave., Philadelphia, Pa.

ASSOCIATE MEMBERS.

BALDWIN, ERNEST HOWARD. Care, U. S. Reclamation Service, Alcova, Wyo.

BELKNAP, JOHN MANSFIELD. Office of Asst. Terminal Engr., N. Y. C. & H. R. R. R., 113 East 18th St., New York City.

ASSOCIATE MEMBERS.

CHASE, RUSSELL. Asst. Engr., O. R. & N. Co., Portland, Ore.

DAVIS, ARTHUR LINCOLN. Asst. to Pres., Am. Bridge Co. of N. Y., 42 Broadway, New York City.

DIEHR, ALVAH BENJAMIN. Route 4, Nevada, Mo.

DUNCAN, LINDSAY. Engr., Taylor-Moore Constr. Co., Cedar Creek, Colo.

FERGUSON, WILLIAM HASTINGS. Goldfield, Nev.

FORCHHAMMER, HERLUF TROLLE. Care, Mrs. Gibbs, 139 East 46th St., New York City.

FROST, GEORGE SHERMAN. Asst. Engr., Rapid Transit R. R. Comm., 325 West 56th St., New York City.

FULLER, CARL HAMILTON. Care, Am. Structural Steel Co., 1183 Broadway, New York City.

HALLIHAN, JOHN PHILIP. Asst. to Pres. and Chf. Engr., Ferrocarril Rio Grande, Sierra Madre y Pacifico, S. A., P. O. Box 687, El Paso, Tex.

HAMLIN, WILLIAM ELIOT. Care, Brown, Shipley & Co., 123 Pall Mall, S. W., London, England.

HAZEN, WILLIAM NELSON. Care, Expanded Metal Eng. Co., 256 Broadway, New York City.

HOLMES, GLENN DICKINSON. Engr. of Water Supply, Barge Canal, Rome, N. Y.

HUNTER, ROBERT EASTON. 776 Yance St., Montreal, Que., Canada.

JAUDON, HENRY SCUDDER. Quitman, Ga.

JOHNSON, ARTHUR NEWHALL. Highway Engr., U. S. Office of Public Roads, Washington, D. C.

KYLE, GEORGE ALLAN. Engr. of Surveys, Alaska Central Ry., Seward, Alaska.

LANE, HARRY ALFRED. Asst. Engr., B. & O. R. R. Co., Hillsboro, Ohio.

LEPPER, FRED WILLIAM. Supt., Constr., U. S. Post Office, Custom House and Court House, 504 Chamber of Commerce Bldg., Cleveland, Ohio.

LOCKWOOD, WILLARD DATUS. 30 Harper St., Rochester, N. Y.

MACDONALD, ARCHIBALD ANGUS. 1 Madison Ave., New York City.

MANAHAN, ELMER GOVE. Asst. Engr. in Chg. of Filtration Works, Board of Trustees, Commissioners of Water Works, Cincinnati, Ohio.

MAXIMOFF, SERGIUS PAVLOVITCH. Engr. to the Imperial Russian Govt.; Asst. at the Imperial Inst. of Public Ways at St. Petersburg, Zabalkanski pr. 27, St. Petersburg, Russia.

MOSES, PERCIVAL ROBERT. Cons. Engr., 320 Fifth Ave., New York City.

NEUMEYER, ROBERT ENGLER. 501 Market St., Bethlehem, Pa.

Osborn, Ollie Steele. Box 750, El Paso, Tex.

Pillsbury, George Bigelow. Skaguay, Alaska.

Pruyn, Francis Lansing. Treas., The United Eng. & Contr. Co., 32 East 33d St., New York City.

Sabine, Edward Dana. Terminal Engr.'s Office, Grand Central Palace, New York City.

Scott, Charles Bruce. Lawson, W. Va.

Seltzer, Harry Kent. P. O. Box 445, Austin, Tex.

Shertzer, Tyrrell Bradbury. Asst. Engr., Rapid Transit R. R. Comm., 467 West 152d St., New York City.

Tilden, Charles Joseph. 1002 Cornwell Pl., Ann Arbor, Mich.

Umstead, Charles Henry. 422 Trust Bldg., Washington, Pa.

Vogleson, John Albert. 1810 Chestnut St., Philadelphia, Pa.

Wadsworth, Joel Edward. Res. Engr., Am. Bridge Co., 42 Broadway, New York City.

Walther, Edward. Care, Fairbanks, Morse & Co., Cor. Franklin and Monroe Sts., Chicago, Ill.

ASSOCIATES.

Belden, Edgar Tweedy. 40 Lyon St., New Haven, Conn.

Dailey, John Alexander. 105 North 18th St., East Orange, N. J.

Farrell, Edward James. 159 West 125th St., New York City.

JUNIORS.

Alexander, Robert Lee. Res. Engr., Little Rock & Southern R. R., Crossett, Ashley Co., Ark.

Backes, William James. 138 Oak St., Weehawken Heights, N. J.

Becker, Sylvanus A. Asst. Engr., Central Kansas Div., Mo. Pac. Ry., P. O. Box 725, Osawatomie, Kans.

Brinkley, Milo Hamilton. Asst. Engr., G. N. Ry., Ashland, Nebr.

Goddard, Herbert Willard. Asst. Civ. Engr., The T. A. Gillespie Co., Westinghouse Bldg., Pittsburg, Pa.

Greenlaw, Ralph Weller. Asst. Engr., 3d Div., Rapid Transit R. R. Comm., 415 West 118th St., New York City.

Howes, Ralph Holt. Civ. Engr. and Supt., Const., Wells Bros. Co. of N. Y., 9 Summit Ave., Brookline, Mass.

Ireland, Mark Lorin. 2d Lieut., Artillery Corps, Fort Monroe, Va.

Melius, Ludlow Lawrence. Glenmont, Albany Co., N. Y.

Tombo, Carl. P. O. Box 161, Salem, Ind.

Wyckoff, Charles Rapelyea, Jr. 185 Penn St., Brooklyn, N. Y.

Yates, William Henry. Tutor in Civ. Eng., Columbia Univ., 78 West 94th St., New York City.

DEATHS.

JUNIORS.

Shukichi, Fujino. Elected Junior February 3d, 1903; date of death unknown.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(April 9th, 1905, to May 6th, 1905.)

NOTE.—*This list is published for the purpose of placing before the members of the Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal,* Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings,* Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal,* Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal,* Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions,* Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly,* Columbia Univ., New York City, 50c.
(7) *Technology Quarterly,* Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator,* Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine,* New York City, 25c.
(10) *Cassier's Magazine,* New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News,* New York City, 15c.
(14) *The Engineering Record,* New York City, 12c.
(15) *Railroad Gazette,* New York City, 10c.
(16) *Engineering and Mining Journal,* New York City, 15c.
(17) *Street Railway Journal,* New York City, 35c.
(18) *Railway and Engineering Review,* Chicago, Ill., 10c.
(19) *Scientific American Supplement,* New York City, 10c.
(20) *Iron Age,* New York City, 10c.
(21) *Railway Engineer,* London, England, 25c.
(22) *Iron and Coal Trades Review,* London, England, 25c.
(23) *Bulletin,* American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal,* New York City, 10c.
(25) *American Engineer,* New York City, 20c.
(26) *Electrical Review,* London, England.
(27) *Electrical World and Engineer,* New York City, 10c.
(28) *Journal,* New England Water-Works Assoc., Boston, $1.
(29) *Journal,* Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique.* Brussels, Belgium.
(31) *Annales de l'Assoc. des Ing. Sortis des Ecoles Specialcs de Gand.* Brussels, Belgium.
(32) *Memoires et Compte Rendu des Travaux,* Soc. Ing. Civ. de France, Paris, France.
(33) *Le Genie Civil,* Paris, France.
(34) *Portefouille Economique des Machines,* Paris, France.
(35) *Nouvelles Annales de la Construction,* Paris, France.
(36) *La Revue Technique,* Paris, France.
(37) *Review de Mecanique,* Paris, France.
(38) *Revue Generale des Chemins de Fer et des Tramways,* Paris, France.
(39) *Railway Master Mechanic,* Chicago, Ill., 10c.
(40) *Railway Age,* Chicago, Ill., 10c.
(41) *Modern Machinery,* Chicago, Ill., 10c.
(42) *Transactions,* Am. Inst. Elect. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussees,* Paris, France.
(44) *Journal,* Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals,* Scranton, Pa., 20c.
(46) *Scientific American,* New York City, 8c.
(47) *Mechanical Engineer,* Manchester, England.
(48) *Zeitschrift,* Verein Deutscher Ingenieure, Berlin, Germany.
(49) *Zeitschrift für Bauwesen,* Berlin, Germany.
(50) *Stahl und Eisen,* Düsseldorf, Germany.
(51) *Deutsche Bauzeitung,* Berlin, Germany.
(52) *Rigasche Industrie-Zeitung,* Riga, Russia.
(53) *Zeitschrift,* Oesterreichischer Ingenieur und Architekten Verein, Vienna, Austria.
(54) *Transactions,* Am. Soc. C. E., New York City, $5.

(55) *Transactions,* Am. Soc. M. E., New York City, $10.
(56) *Transactions,* Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian,* London, England.
(58) *Proceedings,* Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions,* Mining Inst. of Scotland, London and Newcastle-upon-Tyne, England.
(60) *Municipal Engineering,* Indianapolis, Ind., 25c.
(61) *Proceedings,* Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World,* 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings,* Inst. C. E. London, England.
(64) *Power,* New York City, 20c.
(65) *Official Proceedings,* New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting,* London, England, 15c.
(67) *Cement and Engineering News,* Chicago, Ill., 25c.
(68) *Mining Journal,* London, England.
(69) *Mill Owners,* New York City, 10c.
(70) *Engineering Review,* New York City, 10c.
(71) *Journal,* Iron and Steel Inst., London, England.
(72) *Street Railway Review,* Chicago, 30c.
(73) *Electrician,* London, England, 18c.
(74) *Transactions,* Inst. of Min. and Metal., London, England.
(75) *Proceedings,* Inst. of Mech. Engrs., London, England.
(76) *Brick,* Chicago, 10c.
(77) *Journal,* Inst. Elec. Engrs., London, England.
(78) *Beton und Eisen,* Vienna, Austria.
(79) *Forscherarbeiten,* Vienna, Austria.
(80) *Tonindustrie-Zeitung,* Berlin, Germany.
(81) *Zeitschrift fur Architektur und Ingenieurwesen,* Wiesbaden, Germany.
(82) *Dinglers Polytechnisches Journal,* Berlin, Germany.

LIST OF ARTICLES.

Bridge.

Reinforced Concrete Culverts for Highways.* T. E. McDonald. (Paper read before the Cement Users' Assoc.) (67) Mar.; (60) May.
Concrete-Steel Arch Bridge at Kankakee, Illinois.* J. B. Marsh. (4) Apr.
An Attempt to Show Graphically the Deflections and Bending Moments in the Britannia Tubular Bridge as described in Clarke's Book, Vol. 11.* (21) Apr.
The Victoria Falls Bridge.* (12) Apr. 7; (14) Apr. 29.
The Cuyahoga Valley Viaduct.* G. H. Tinker. (15) Apr. 14.
An Australian Electrically Equipped Drawbridge.* (27) Apr. 15.
Strengthening Traction Bridges.* H. G. Tyrrell. (72) Apr. 15.
Erection of the Cambridge Bridge, Boston.* (14) Apr. 15.
A Shallow Solid-Floor Girder.* (15) Apr. 21.
Erection of the Bellows Falls Arch Bridge.* (14) Apr. 29.
The Southwestern Ave. Boulevard Nine-Track Viaduct in Chicago.* (14) Apr. 29.
The Lebanon Valley Double-Track Skew Plate-Girder Bridge.* (14) Apr. 29.
Making the Cables of a Large Suspension Bridge.* Isaac Harby, Assoc. M. Am. Soc. C. E. (10) May.
The Use of a Novel Water Jet for Driving Piles for the Sandy Hook Proving Ground Railroad Trestle.* Sherman A. Jubb. (13) May 4.
The Development in Railroad Bridge Design and Construction.* Henry W. Hodge. (15) May 5.
Die Neue Strassenbrücke über die Spree bei Oberschöneweide bei Berlin.* Karl Bernhard. (51) Serial beginning Mar. 31.
Eine 116m. Lange Balkenbrücke in Armiertem Beton, System Hennebique.* D. Goldenberg. (78) Apr.
Entwürfe für Eine Vereinigte Eisenbahn- und Strassenbrücke über die Oder bei Neusalz.* F. Dircksen. (48) Serial beginning Apr. 15.

Electrical.

Middlesbrough Dock Electric and Hydraulic Power Plant.* Vincent L. Raven, M. I. Mech. E. (75) No. 3, 1904.
Compensated Alternate Current Generators.* Miles Walker. (77) Vol. 34, Pt. 2.
The Combination of Dust Destructors and Electricity Works Economically Considered.* W. P. Adams, M. I. E. E. (77) Vol. 34, Pt. 2.
High-Tension Switchgear.* Leonard Andrews, M. I. E. E. (77) Vol. 34, Pt. 2.
Armature Reaction in Alternators.* James B. Henderson, M. I. E. E., and John S. Nicholson. (77) Vol. 34, Pt. 2.
Condensing Arrangements in Central Stations. J. D. Baille, Assoc. M. I. E. E. (77) Vol. 34, Pt. 2.
The Magnetic Properties of Some Alloys of Iron and Silicon.* Thomas Baker. (77) Vol. 34, Pt. 2.
Hydro-Electric Power Development and Transmission in California. Robert McF. Doble. (1) Mar.

*Illustrated.

Electrical—(Continued).

Weak Points in Long-Distance Electric Transmission. James C. Bennett. (1) Mar.
Bimetallic Rheostats.* F. Punga. (26) Mar. 31.
Underground Electrical Construction.* Louis A. Ferguson. (Abstract of Paper read before the International Elec. Cong.) (73) Mar. 31.
The Yarmouth-Gorleston Submarine Cable.* (73) Mar. 31.
Water-Power Plant for a Cordite Factory in India.* (12) Mar. 31.
The Present Status of Electric Furnace Working.* Charles F. Burgess. (4) Apr.
Notes on the Use of Rare Earths in Electric Illuminants.* Murray C. Beebe. (58) Apr.
Denny and Johnson's Torsion Meter.* (11) Apr. 7.
The 36,000-Volt Hydro-Electric Installation of the Cellina (Italy).* Enrico Bignami. (26) Apr. 7.
A New Motor-Starting Panel with Circuit Breaker for Individual Driving.* (17) Apr. 8.
Headworks of the Plant of the Toronto & Niagara Power Co., Niagara Falls.* (14) Apr. 8.
Largest Electric Water Power in Maine.* (27) Apr. 8.
The Power Installation of a Coffee-Roasting and Spice-Grinding Plant.* H. S. Knowlton. (27) Apr. 8.
Transformer Practice. C. W. Humphrey. (27) Apr. 8.
Flux Distribution in Design. A. Press. (27) Apr. 8.
On the Electrical Drive of Large Reversing Engines Working Intermittently.* Maurice Georgi. (Paper read before the Glasgow Technical College Scientific Soc.) (57) Serial beginning Apr. 14.
The Gersthofen Hydro-Electric Power Station.* (12) Apr. 14.
New Party-Line Telephone System.* (26) Apr. 14; (73) Apr. 14.
A New Underground Cable System.* Axel Hultman. (26) Apr. 14.
A New Oscillographic Wave Tracer.* Rudolf Goldschmidt. (73) Apr. 14.
Recent Experiments on the Nature of Magnetism.* Emile Guarini. (19) Apr. 15.
Single Wattmeter on Edison Three-Wire System. L. A. Freudenberger. (27) Apr. 15.
New American System of Wireless Telegraphy.* James Foster King. (27) Apr. 15.
The Starting of Rotary Converters.* Sydney Woodfield. (26) Apr. 21.
Electric Lighting of the Middleburg Cantonments, South Africa.* (26) Apr. 21.
The Church Stretton Gas-Driven Electricity Works.* (26) Apr. 21.
Electric Locomotive Cranes.* (12) Apr. 21.
The London Wall Telephone Exchange.* (73) Apr. 21.
2 700 Horse-Power Turbo-Alternator.* (12) Apr. 21.
Choke Coils.* (17) Apr. 22.
Westinghouse Direct-Current Power Distribution System.* (27) Apr. 22.
Nitric Acid in Insulation of High-Tension Alternator Coils. Charles E. Farrington. (27) Apr. 22.
Loss Due to Surplus Capacity in Transformers. J. S. Codman. (27) Apr. 22.
Artom Selective System of Wireless Telegraphy.* A. Frederick Collins. (27) Apr. 22.
Municipal Arc Lighting Plant in Columbus, Ohio.* C. Wiler. (27) Apr. 22.
The Slip of an Induction Motor.* B. F. Bailey. (27) Apr. 22.
The Metallic Arc.* Isador Ladoff. (27) Apr. 22.
A New Method of Testing Alternating-Current Generators.* H. M. Hobart and F. Punga. (27) Apr. 22.
The Fleming Cymometer. (24) Apr. 24.
The Sturtevant 100-Kw. Generating Set.* (20) Apr. 27.
New Storage Battery.* (15) Apr. 28; (14) Apr. 29; (17) Apr. 29; (27) Apr. 29; (13) May 4.
How to Remember the Wire Table. Charles F. Scott. (From *Electric Club Journal.*) (19) Apr. 29.
A Norwegian Hydro-Electric Plant.* T. Norberg Schulz. (27) Apr. 29.
The Practical Design of the Solenoid.* Charles R. Underhill. (27) Apr. 29.
Line Effects Due to a Moving Load.* Carl P. Nached. (27) Apr. 29.
New Westinghouse Apparatus.* (27) Apr. 29.
The Cooper Hewitt Mercury Vapor Converter.* A. Frederick Collins. (46) Apr. 29.
Tesla Patent on Wireless Transmission of Electrical Signals.* (27) Apr. 29.
The Electric Railway Freight Service. H. H. Polk. (17) Apr. 29.
The Cutler-Hammer Magnetic Accelerator.* (41) May.
Alternating Current Switches.* (25) May.
A New Secret Service Telephone.* (19) May 6.
Le Matériel Thury à l'Usine de Vouvry (Valais-Suisse).* C. F. Guilbert. (36) Serial beginning Mar. 25.
Les Petits Groupes Électrogènes Considérés au Point de Vue de la Production Économique de l'Énergie Électrique. R. Friédérich. (36) Mar. 25.
Untersuchung des Auslaufweges Elektrischer Aufzüge. Hugo Stahl. (48) Apr. 8.
Die Tantal-Lampe. (82) Apr. 22.

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Marine Engineering.* W. F. Durand, M. Am. Soc. M. E. (54) Vol. 54, Pt. C.
Marine Engineering in France. V. Daymard and R. Lelong. (Tr. from the French by Paul A. Seurot, M. Am. Soc. C. E.) (54) Vol. 54, Pt. C.
The *Discovery:* On the Design of the Antarctic Exploration Vessel *Discovery.** W. E. Smith. (Paper read before the Inst. of Naval Archts.) (11) Apr. 14.
Electricity as Motive Power for 1 100-Ton Cargo-Boat.* J. W. H. Hamilton. (27) Apr. 15.
Model Experiments on Hollow *versus* Straight Lines.* R. E. Froude. (Paper read before the Inst. of Naval Archts.) (11) Apr. 21; Abstract (12) Apr. 21.
The Japanese Cruisers *Kasuga* and *Nisshin.** N. Soliani. (Paper read before the Inst. of Naval Archts.) (11) Apr. 21.
Marine Gas Engine.* (12) Apr. 21.
The effect of Acceleration on Ship Resistance. C. E. Stromeyer. (Paper read before the Inst. of Naval Archts.) (11) Apr. 21.
A Method of Preventing Vibration in Steamships.* A. Mallock. (Paper read before the Inst. of Naval Archts.) (47) Apr. 22.
A Leadless Soundiug Apparatus.* Alfred Gradenwitz. (46) Apr. 22.
The New First-Class Japanese Battleship *Kashima.** Harold J. Shepstone. (19) Apr. 22.
New Masonry Drydock at the Boston Navy Yard.* (46) Apr. 29.

Mechanical.

The Manufacture of Cement.* R. W. Lesley, Assoc. Am. Soc. C. E. (54) Vol. 54, Pt. B.
Passenger Elevators.* Thomas E. Brown, M. Am. Soc. C. E. (54) Vol. 54, Pt. B.
Fuel Economy in Steam Power Plants.* William H. Booth and John B. C. Kershaw. (77) Vol. 34, Pt. 2.
The Curtis Steam-Turbine.* W. L. R. Emmet, Am. Soc. M. E. (75) No. 3, 1904.
Different Applications of Steam-Turbines.* A. Rateau. (75) No. 3, 1904.
Experiments with a Lathe-Tool Dynamometer.* J. T. Nicolson. (75) No. 3, 1904.
Some Theoretical and Practical Considerations in Steam-Turbine Work.* Francis Hodgkinson, Am. Soc. M. E. (75) No. 3, 1904.
The De Laval Steam-Turbine.* E. S. Lea, Am. Soc. M. E., and E. Meden. (75) No. 3, 1904.
Mixing Cement. R. G. Coutts. (Paper read before the Cement Users' Convention.) (67) Mar.
Suction Gas Producers.* (12) Serial beginning Mar. 31.
Rolling Mill Engines. Robert J. Worth. (Extracts from Address before the Cleveland Inst. of Engrs.) (22) Mar. 31.
Large Coal and Ash Handling Plant.* (22) Mar. 31.
The Hornsby Vertical Oil-Engine.* (11) Mar. 31.
The Diesel Oil Engine.* (12) Mar. 31.
Water-Coolers for Motor-Cars. J. S. V. Bickford. (11) Mar. 31.
Notes on Engineering Alloys. (11) Mar. 31.
A Rapid Production Vertical Turret Lathe.* (39) Apr.
Trip-Valve Motion for Steam Engines.* (47) Apr. 1.
Four-Cylinder Internal-Combustion Engine.* (47) Apr. 1.
Internal-Combustion Engines. Prof. Burstall. (Abstract of Lecture delivered before the Liverpool Univ. Eng. Soc.) (47) Apr. 1.
Ammoniacal Liquor and the Manufacture of Sulphate of Ammonia. R. L. Fenner. (Abstract of Paper read before the London and Southern District Junior Gas Assoc.) (66) Apr. 4.
Hydraulics as Applied at Present in Modern Gas Works, and Their Future Possible Application.* Richard Webster. (Abstract of Paper read before the Scottish Junior Gas Assoc.) (66) Apr. 4.
Electrically-Served Semet-Solvay Coke Plant at the Works of the Wigan Coal & Iron Company, Limited.* (22) Apr. 7.
Machine Tool Design.* J. T. Nicolson, M. Inst. C. E., and Dempster Smith. (12) Serial beginning Apr. 7.
500 B. H. P. Gas Driven Dynamo Engine.* (12) Apr. 7.
A New High Duty Shaper.* (17) Apr. 8.
Proportions of Machine Tool Parts.* Thos. R. Shaw. (47) Serial beginning Apr. 8.
Some Features in the Design of Oil Engines.* Edward Butler, M. I. M. E. (47) Serial beginning Apr. 8.
The Defects in Ingot-Iron Castings. K. Hermann Wedding. (From *Iron and Steel Magazine.*) (47) Apr. 8.
Sharp's Differential Flywheel.* (47) Apr. 8.
Multiple Steam Turbines.* A. Melencovich. (Paper read before the Inst. of Engrs. and Shipbuilders in Scotland.) (47) Apr. 8.
De Brouwer Charging and Discharging Machines at Lancaster.* (66) Apr. 11.
The New Gas-Works at Nuremberg.* (66) Apr. 11.
Gas Blowing Engines.* Tom Westgarth. (Abstract of Paper presented before the West of Scotland Iron and Steel Inst.) (20) Apr. 13.

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A New Oil Engine.* (12) Apr. 14.
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Pressure Recorder for Gas Producers in Steel Works.* (22) Apr. 14.
Kennedy's Piston Inlet and Outlet Air-Valves for Blowing-Engines.* (11) Apr. 14.
Gas Producers in Ironworks.* Otto Wolff. (Paper read before the Assoc. of Ironmasters in South-West Germany.) (22) Apr. 14.
Gas Engines for Railway and Power Service.* (72) Apr. 15.
The New Works of the Ingersoll-Sergeant Drill Company.* (14) Serial beginning Apr. 15.
Crocker-Wheeler-Terry Turbo-Generating Set.* (27) Apr. 15.
Measuring Angular Velocity of Engines.* F. W. Springer. (27) Apr. 15.
Pattern Making.* R. Watson. (Paper read before the Rugby Eng. Soc.) (19) Apr. 15.
Power Production from Gaseous Fuel.* J. R. Bibbins. (Paper read before the Ohio Gas Light Assoc.) (24) Apr. 17; Abstract (14) Apr. 8.
More Light on the Tar Situation.* F. C. Slade. (24) Apr. 17.
The Testing and Valuation of Gas Coals. A. Edwards. (Paper read before the Yorkshire Junior Gas Assoc.) (66) Apr. 18.
Spencer's Vertical Hurdle Grid. (66) Apr. 18.
Gasholders and Tanks: Notes and Queries.* W. D. Child. (Paper read before the Eastern Counties Gas Mgrs. Assoc.) (66) Apr. 18.
Boosting and its Application to the Distribution of Gas. W. E. Dean. (Abstract of Paper read before the London and Southern District Junior Gas Assoc.) (66) Apr. 18.
The Proportions of Ingredients in Portland Concrete.* Richard T. Dana, Assoc. M. Am. Soc. C. E. (13) Apr. 20.
The Weber Suction Gas Producer.* (20) Apr. 20.
An Air Compressor with Mechanically Controlled Poppet Valves.* (13) Apr. 20; (16) Apr. 20; (17) Apr. 22; (41) May.
The Hughes Annealing Furnace.* (20) Apr. 20.
Feeding Modern Gas Motors. Emile Guarini. (From *The Gas Engine.*) (62) Apr. 20.
The Lentz Engine.* (12) Apr. 21.
The Electrical Driving of Rolling Mills.* (22) Apr. 21.
Application of Ball-Bearings to High-Speed Machinery.* W. Scott Lysle. (27) Apr. 22.
Steam Turbine Power Plant at a Poughkeepsie Shop.* (14) Apr. 22.
Effect of Oil on Strength of Boiler Furnaces.* D. B. Morison. (Paper read before the North-east Coast Inst. of Engrs. and Shipbuilders.) (47) Serial beginning Apr. 22.
Friction Clutches.* George A. F. Pover. (From *Technics.*) (19) Apr. 22.
Refractory Materials for Furnace Linings. E. Kilburn Scott. (Abstract of Paper read before the Faraday Soc.) (47) Apr. 22.
Improved Valve Gear for Gas Engines.* (47) Apr. 22.
Steam Engine Governors.* (47) Serial beginning Apr. 22.
Gas Producer for Bituminous Fuels.* (47) Apr. 22.
Report of Committee on Flow of Gas in Pipes. (Read before the Ohio Gas Light Assoc.) (24) Apr. 24.
The Methane-Hydrogen Gas Plant at Truro.* (66) Apr. 25.
Working with Deep Purifiers. C. H. Gifford. (Paper presented before the New England Assoc. of Gas Engrs.) (66) Apr. 25.
Notes on Concrete Block Manufacture. Fred. W. Haglock. (From *The National Builder.*) (13) Apr. 27.
Suction Gas Producers. Oskar Nagel. (19) Apr. 29.
Svea Caloric Engine.* G. Emil Hesse. (19) Apr. 29.
An Efficient Disk Transmission for Automobiles.* (46) Apr. 29.
Variable Speed Motors for Driving Machine Tools. (14) Apr. 29.
A Comparison of the Theoretical With the Actual Fuel Consumption in Cement Burning. Henry S. Spackman. (Paper read before the Assoc. of Amer. Portland Cement Mfrs.) (14) Apr. 29.
Belting. (25) May.
The Oerlikon Construction Shops in Switzerland.* L. Ramakers. (41) May.
The Hullett Automatic Ore Unloader.* Waldon Fawcett. (41) May.
European Gas Engines and Producer Plants.* Frank C. Perkins. (41) May.
The Franklin Four-Cylinder, Air-Cooled Motor.* (41) May.
Steam Engineering in Paper Mills. E. S. Farwell. (10) May.
Small Instruments of Measurement.* Joseph Horner. (10) May.
Grain Storage and Manipulation at the Quayside: with Special Reference to the Practice at British Ports.* Brysson Cunningham, Assoc. M. Inst. C. E. (10) May.
The Design and Operation of the Suction Gas Producer.* Rodolphe Mathot. (9) May.
Testing Coals and Lignites at the St. Louis World's Fair.* E. W. Parker. (9) May.
The Effects of Vacuum on Steam-Engine Economy.* R. M. Neilson. (9) May
The Ridgway Boring and Turning Mill.* (39) May.
Three-Foot Arm Combination Radial Drill.* (39) May.

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Installation and Care of Exhausters. E. D. Johnson. (Paper read before the Ohio Gas Light Assoc.) (24) May 1.
Long Distance Transmission of Gas. W. H. Hammon. (Paper read before the Ohio Gas Light Assoc.) (24) May 1.
Water Cooled Ports for Open Hearth Furnaces.* (20) May 4.
A Variable-Speed Gear: Giving All Speeds from Zero to a Maximum.* (From *Technics.*) (19) May 6.
Étude sur les Broyeurs.* Pierre Blanc. (37) Serial beginning Mar. 31.
Machines à Poser les Brides sur les Tuyaux Metalliques.* (33) Apr. 8.
Einige Bemerkungen über Verzahnungen.* E. Hagen-Torn. (52) Serial beginning Mar. 15.
Die Wolfsche Heissdampflokomobile in Tonindustriebetrieben.* Wiedemann. (Paper read before the Deutscher Verein für Ton-, Zement- und Kalkindustrie E. V.) (80) Mar. 30.
Ein Neues Project der Verwertung von Torfmooren. M. Glasenapp. (52) Mar. 31.
Der Mechanische Wirkungsgrad und die Indizierte Leistung der Gasmaschine. (48) Apr. 1.
Neue Stahl- und Walzwerksanlagen der Illinois Steel Company in South Chicago. (From the *Iron Trade Review.*) (50) Apr. 1.
Das Dampfturbinen-Kraftwerk St. Ouen.* Ludwig Troske. (48) Serial beginning Apr. 1.
Dampfturbinen.* (80) Apr. 4.
Das Kalibrieren der Profilwalzen für I-Eisen.* Carl Holzweiler. (50) Apr. 15.
Guss von Oben, Guss von Unten.* A. Messerschmitt. (50) Apr. 15.
Erfahrungszahlen auf dem Gebiete der Feuerungstechnik. (80) Apr. 18.
Ueber Härtung von Kalksandsteinen.* E. Cramer. (Paper read before the Verein der Kalksandsteinfabriken E. V.) (80) Apr. 20.
Neuere Werkzeugmaschinen.* Paul Möller. (48) Apr. 22.

Metallurgical.

Cast-Iron: Strength, Composition, Specifications.* W. J. Keep, M. Am. Soc. M. E. (75) No. 3, 1904.
The Effects of Strain and of Annealing in Aluminium, Antimony, Bismuth, Cadmium, Copper, Lead, Silver, Tin, and Zinc.* William Campbell. (75) No. 3, 1904.
Gayley's Dry Air Blast. F. A. Willcox. (22) Mar. 31.
The Backlund-Burman Traveling Charging Machine for Blast Furnaces.* (20) Apr. 13.
Are the Reactions in the Blast Furnace Known? A. D. Elbers. (62) Serial beginning Apr. 13.
Cyanidation in the South.* Herbert A. Megraw. (16) Apr. 13.
Cupellation and Parting.* T. Kirke Rose. (From the *Journal* of the Chem., Metallurgical and Min. Soc. of South Africa.) (16) Apr. 13.
The Effect of Liquid Air Temperatures on the Mechanical and Other Properties of Iron and its Alloys. *Sir* James Dewar, Hon. M. I. C. E., and Robert Asholt Hadfield, M. I. C. E. (Paper read before the Royal Soc.) (19) Apr. 15.
The Brayshaw Salt Bath Hardening Furnace.* Emile Guarini. (20) Apr. 20.
Dry Air Blast Furnace Process. (62) Apr. 20.
The Limits of Fuel Economy in the Blast Furnace. A. D. Elbers. (62) Serial beginning Apr. 20.
Precipitation of Gold from Cyanide Solutions. W. J. Sharwood. (Abstract of Paper read before the California Miners' Assoc.) (16) Apr. 20.
Milling Practice at the Camp Bird.* Stephen L. Goodale. (16) May 4.
The Michigan Smelter.* R. T. White. (16) May 4.
Generatoren im Hüttenbetrieb.* Wolff. (50) Apr. 1.
Über Anreicherung von Eisenerzen.* Dr. Weiskopf. (50) Serial beginning Apr. 15.
Das Trocknen der Gebläseluft bei Hochöfen. Haedicke. (82) Apr. 15.

Military.

Gun Construction in the United States.* Odus C. Horney. (54) Vol. 54, Pt. B.
Seacoast Gun-Carriage Design and Construction.* Edward P. O'Hern. (54) Vol. 54, Pt. B.
Ammunition for Cannon. Thales L. Ames. (54) Vol. 54, Pt. B.
The Art of Designing and Constructing Mobile Artillery.* George W. Burr. (54) Vol. 54, Pt. B.
The Art of Designing and Constructing Small Arms.* John T. Thompson. (54) Vol. 54, Pt. B.
A Practical Method of Adjusting a Modern Gun and Determining Its Errors and the Errors of Its Telescopic Sight.* Otto von Geldern, M. Am. Soc. C. E. (13) Apr. 13.
Disappearing Coast-Defense Guns.* (46) Apr. 22.
A New Automatic Machine Rifle. (46) Apr. 29.
Experimental Firing with the U. S. Magazine Rifle, Model of 1903.* W. C. Brown. (44) May-June.

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Mining.

Winding of Minerals from Inclined Shafts.* Robert Crawford. (59) Vol. 27, Pt. 2.
Coal-Mining in Borneo.* James Roden. (59) Vol. 27, Pt. 2.
Notes on the Application of Electric Power at Mines in Germany.* E. O. Forster Brown. (59) Vol. 27, Pt. 3.
"Little Hardy" Coal-Cutter.* (57) Mar. 31.
Sinking Arrangements at Groesfaen.* (22) Mar. 31.
Recent Dredging Practice in Australia and New Zealand. H. L. Lewis. (68) Serial beginning Apr. 1.
Mechanical Coal Conveying at the Face.* Harry Palmer. (Abstract of Paper in *Journal* of the British Soc. of Min. Students.) (57) Apr. 7.
Electric Switches and Description of a Patent Safety Switch for Use in Mines.* Wm. Maurice. (Paper read before the National Assoc. of Colliery Mgrs.) (22) Apr. 7.
Caps or Attachments for Winding Ropes.* W. H. Becker. (Abstract of Paper read before the South Wales Inst. of Engrs.) (22) Apr. 7.
Sea Barrier at the Hodbarrow Mines.* (11) Apr. 7.
Dumping Devices.* W. R. Crane. (16) Apr. 13.
A New Gasoline Rock Drill.* (13) Apr. 13; (16) Apr. 27.
Electric Winding Engine of the Tiremande Mine.* A. Gradenwitz. (26) Apr. 14
Pumping the Comstock Lode Mines.* Carl George P. de Laval. (19) Apr. 15.
Electric Switches for Use in Mines.* Wm. Maurice. (Paper read before the National Assoc. of Colliery Mgrs.) (47) Apr. 15.
Safety Lamps for Belgian Coal Mines.* (16) Apr. 20.
The Use of Concrete in the Working of Thick Seams. M. Piffaut. (Abstract of Paper read before the North of England Inst. of Min. and Mech. Engrs.) (57) Apr. 21.
The Oolitic Iron-Ore Deposits of Lorraine. L. Bailly. (From *Annales des Mines.*) (22) Apr. 21.
Deterioration of Winding Ropes. J. A. Vaughan and W. M. Epton. (Extracts from Paper read before the Transvaal Inst. of Mech. Engrs.) (57) Apr. 21, Sup.
Dredges for Working Gold-Bearing Gravels.* (13) Apr. 27.
Types of Coal-Mine Cars.* R. V. Norris. (16) Apr. 27.
Winding Rope with Too High an Initial Factor of Safety. H. J. S. Heather. (From *Journal* of the Mech. Engineers' Assoc. of the Witwatersrand.) (16) Apr. 27.
The Cost of Mining and Milling.* R. J. Grant. (16) Apr. 27.
Coal Conveyors in Longwall Working * Harry Palmer. (Abstract of Paper in the *Journal* of the British Soc. of Min. Students.) (16) May 4.
Air Power in the Quarry. (Lucius I. Wightman. (16) Serial beginning May 4.
Diamond Drilling Under Difficulty. S. C. Thomson. (Abstract of Paper read before the South African Assoc. of Engrs.) (16) May 4.
Sprengung einer Dreikammermine im Passgrubsteinbruche nächst Greifenstein am 9. Juni 1904.* Hugo Münch. (53) Apr. 7.

Miscellaneous.

Technical Training.* Wilfred J. Lineham, M. Inst. C. E. (Abstract of Address delivered before the Assoc. of Teachers in Technical Inst.) (47) Apr. 1.
Amerikanische Technische Laboratorien.* Ant. Gramberg. (48) Apr. 22.

Municipal.

Making Oiled Roads. A. S. Atkinson. (19) Apr. 15.
Automobile Fire Engine.* (47) Apr. 15.
Construction of Sections 3 and 4, Riverside Drive Extension, New York.* (14) Apr. 15.
A Moving Platform Elevator for Teams at Cleveland, Ohio.* (13) Apr. 27.
The Charles River Speedway of the Boston Metropolitan Park System.* Wm. T. Pierce, M. Am. Soc. C. E. (14) Apr. 29.
The Development of the State Highway System of Rhode Island. A. H. Blanchard. (Presented before the Amer. Assoc. for the Advancement of Science.) (14) Apr. 29.
Concrete Paving and Paving Materials.* H. L. Weber. (Extracts from Paper read before the Ohio Soc. of Surveyors and Civil Engrs.) (60) May.

Railroad.

The Concurrent Development of Traffic on Improved Waterways and on Railroads.* Edward P. North, M. Am Soc. C. E. (54) Vol. 54, Pt. B.
Ventilation of Tunnels.* Charles S. Churchill, M. Am. Soc. C. E. (54) Vol. 54, Pt. C.
Ventilation of Tunnels.* Francis Fox, M. Inst. C. E. (54) Vol. 54, Pt. C.
Notes on Testing Locomotives in England: Testing Plant on the Great Western Railway at Swindon. G. J. Churchward, M. I. Mech. E. (75) No. 3, 1904.
Measured Tests in Service: Instruments and Results Required at a Test. W. F. Pettigrew. M. I. Mech. E. (75) No. 3, 1904.
Four-cylinder Compound Lignite-burning Express Locomotives in Bohemia; Austrian State Railways.* Charles R. King. (21) Serial beginning Mar.

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The Vauclain 4-Cylinder Balanced Compound Locomotive at St. Louis.* H. W. Hanbury, Assoc. M. Inst. C. E. (11) Mar. 31.
New Angus Shops, Canadian Pacific Railway.* (39) Serial beginning Apr.
4-6-2 Type of Locomotive of the C., M. & St. P. Ry. Co.* (39) Apr.
Systems of Electrical Distribution in Railway Shops.* J. Henry Klinck. (39) Apr.
Pullman Car Framing.* (21) Apr.
Drifting Valve.* (39) Apr.
The Compounding of Locomotives.* John Riekie. (Paper read before the Inst. of Engrs. and Shipbuilders in Scotland.) (47) Apr. 1.
50-Ton Mineral Wagons on French Railways.* (11) Apr. 7.
New Terminal of the D., L. & W. R. R. at Hoboken.* (18) Apr. 8.
Quartering Level for Locomotive Driving Wheels.* (18) Apr. 8.
Compound Consolidation Engine with Superheater, M., St. P. & S. S. M. Ry.* (18) Apr. 8; (40) Apr. 14; (25) May.
The New Car-Wheel Foundry of the Pennsylvania R. R.: The Latest Addition to the Great Railway Shops at Altoona, Pa.* (14) Apr. 8.
Locomotives of Great Power. J. E. Muhlfeld. (From *Bulletin* of the International Ry. Cong.) (40) Apr. 14.
Automatic Couplers.* G. Noltein. (From *Bulletin* of the International Ry. Cong.) (40) Apr. 14.
Steel Underframe Gondolas for the B. & O.* (15) Apr. 14.
A Novel Ice Flanger.* (15) Apr. 14.
Shavings Cut from Rails by Wheel Flanges.* (15) Apr. 14.
Pennsylvania Railroad Locomotive Testing Plant.* (40) Serial beginning Apr. 14; (18) Apr. 15; (13) Apr. 20; (25) May.
A Rail Loading and Unloading Machine.* (13) Apr. 20.
Electric Traction. M. F. Paul-Dubois. (From *Bulletin* of the International Ry. Cong.) (40) Apr. 21.
Foreign Tank Locomotives.* (40) Apr. 21.
The Influence of Light Railways on Main Lines. De Burlet. (From *Bulletin* of the International Ry. Cong.) (40) Apr. 21.
Lighting, Heating and Ventilation of Trains. Charles B. Dudley. (From *Bulletin* of the International Ry. Cong.) (40) Apr. 21.
Barker's Mail Pouch Catcher.* (15) Apr. 21.
Railway-Carriage Vestibule.* (11) Apr. 21.
The St. Lazare Boiler Explosion.* (12) Serial beginning Apr. 21.
Schilhan's Safety Switch.* (15) Apr. 21.
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New Car Shops of the D., L. & W. R. R. at Kingsland, N. J.* (18) Apr. 22.
New Erie Passenger Locomotives. (15) Apr. 28.
A Freak Locomotive for South Africa.* (15) Apr. 28.
New B. & O. Freight House at Columbus.* (15) Apr. 28.
Maintenance and Signaling Notes on the Queen & Crescent Route.* (40) Apr. 28.
Improved Rail Crossings. C. W. Buchholz. (From *Bulletin* of the International Ry. Cong.) (40) Apr. 28.
Pacific Locomotive for the Erie.* (40) Apr. 28; (25) May.
A New Type of Compound Articulated Locomotive.* (40) Apr. 28.
Locomotives of Great Power. E. Sauvage. (From *Bulletin* of the International Ry. Cong.) (40) Apr. 28.
Lighting, Heating and Ventilation of Trains. Cajetan Banovits. (From *Bulletin* of the International Ry. Cong.) (40) Apr. 28.
Traffic Conveyed by Motor Cars. (From *Bulletin* of the International Ry. Cong.) (40) Apr. 28.
Electric Traction. Victor Tremontani. (From *Bulletin* of the International Ry. Cong.) (40) Apr. 28.
New Apparatus for Recording the Vibration of Railway Cars.* Emile Guarini. (19) Apr. 29.
Recent Improvements at West Milwaukee, C., M. & St. P. Ry.* (18) Apr. 29.
Four-Cylinder Balanced Compound Locomotive, Erie R. R.* (18) Apr. 29.
Train Staff Operation on New Zealand Railways.* (18) Serial beginning Apr. 29.
The New Hoboken Terminal of the Lackawanna R. R.* (14) Apr. 29.
Shields for the Pennsylvania Railroad Tunnels under Hudson River.* (14) Apr. 29.
The Construction of the Simplon Tunnel.* Leon Monete. (9) May.
Electric Traction for Main Lines of Railway. W. E. Langdon. (10) May.
Sand Houses and Appliances.* (39) May.
Side Door Suburban Passenger Cars: Illinois Central Railroad. (25) May.
A Tabular Comparison of Notable Examples of Recent Locomotives: Arranged with Respect to Classes and Weights. (25) May, Sup.
Report of Committee on Freight Equipment: Rock Island Company. (25) Serial beginning May.
Common Standard Locomotives: Harriman Lines.* (25) May.
Steel Underframe Drop Bottom Gondola Coal Car 50 Tons Capacity: Norfolk & Western Railway.* (25) May.
Production Improvements, Chicago Shops: Chicago & Northwestern Railway.* (25) May.

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Mallet Compound Locomotives, American Railroad, Porto Rico.* (25) May.
Weights of Driving-Wheel Tires.* (25) May.
Vauclain 4-Cylinder Balanced Compound, Erie Railroad: 4-4-2 Atlantic Type.* (25) May.
Recent Development of the Four-Cylinder Balanced Locomotive: With Comments on Superheating. A. Von Borries. (25) May.
New Types of Valves and Valve Gears for Locomotives.* (13) May 4.
An Electric Locomotive with Coupling-Rod Drive.* (13) May 4.
Car-Ferry Steamer *Detroit;* Michigan Central R. R.* (13) May 4.
The Deutsch Car Light System. (62) May 4.
Steel Rails. William R. Webster. (15) May 5.
Gondola Cars for South America.* (15) May 5.
Shavings Exhaust System at the Canadian Pacific Shops.* (40) May 5.
Rails for Lines with Fast Trains. Van Bogaert. (From *Bulletin* of the International Ry. Cong.) (40) May 5.
Cast-Iron Car Wheels. J. E. Muhlfeld. (15) May 5.
Ties and Timber Treatment.* Hermann Von Schenck. (15) May 5.
The Development of Railroad Shop Practice in the United States. M. K. Barnum. (15) May 5.
The Development of the Modern Brake Shoe.* F. W. Sargent. (15) May 5.
La Capacité des Wagons a Marchandises. E. Biard. (32) Jan.
Attelage Automatique.* Boirault. (36) Mar. 25.
Locomotive avec Chaudière à Tubes d'Eau (Système Robert) de la Compagnie Paris-Lyon-Méditerranée (Réseau Algérien).* M. Saussol. (38) Apr.
Wagon a Basculement Latéral et à Accouplement Automatique.* (33) Apr. 15.
Les Nouvelles Locomotives Électriques des Chemins de Fer de la Valteline (Haute-Italie).* (33) Apr. 22.
Die Massenberechnungen für die Kunstbauten der Eisenbahnen.* Puller. (81) Pt. 5, 1904.
Die Elektrische Zugbeleuchtung in den Vereinigten Staaten.* (82) Serial beginning Apr. 1.
Das Dampfturbinen-Kraftwerk St. Ouen.* Ludwig Troske. (48) Serial beginning Apr. 1.
Ueber Einige Eisenbahnsignal-Technische Neuigkeiten.* L. Kohlfürst. (82) Serial beginning Apr. 8.
Die Neuen Vorschläge zur Lösung der Schienenstossfrage.* Fritz Steiner. (53) Apr. 14.
Schnellfahrversuche mit Dampflokomotiven.* (82) Apr. 15.
Die Fabrikation der Eisenbahnradreifen und Achsen.* E. H. Steck. (50) Apr. 15.
Bremsschlitten Patent Schön.* Vz. Pollack. (53) Apr. 21.

Railroad, Street.

Electrically Operated Carriages; Metropolitan Railway.* (21) Apr.
New Steel Cars for the Metropolitan West Side Elevated Railroad, Chicago.* (39) Apr.
Overhead Construction for Single-Phase Lines in Europe.* (17) Apr. 8.
Oerlikon Electric Locomotives.* C. O. Mailloux. (17) Apr. 8.
The Amesbury Trolley Wheel.* (17) Apr. 8.
The Extension of the New York Rapid Transit Railroad System.* (14) Apr. 8; (17) Apr. 8.
The Water and Electric Power Plant of the Utah Sugar Company.* W. P. Hardesty. (13) Apr. 13.
The West Penn Railways System.* (72) Apr. 15.
Tramway System at Chesterfield, England.* (72) Apr. 15.
Third-Rail Insulators.* (72) Apr. 15.
Rail Bonding on the Brooklyn Heights Railroad.* Howard C. Forbes. (72) Apr. 15.
Tramway Car Wheels. A. N. Banister. (Abstract of Paper read before the Assoc. of Tramway and Light Ry. Officials.) (72) Apr. 15.
The Boston & Worcester New Sub-Station at Marlboro.* (72) Apr. 15.
The Columbus, Newark & Zanesville Electric Railway.* (17) Apr. 15.
Is a Universal Type of Railway Motor Advisable? A. H. Armstrong. (17) April 15.
Car Ventilation. Edward Taylor. (17) Apr. 15.
The Burning Out of Electric Street-Car Controllers.* Sydney W. Ashe. (13) Apr. 20.
Gibb's Steel Railway Car.* (11) Apr. 21.
Reducing Noise on the Chicago Elevated Roads.* (15) Apr. 21.
Third Rail Connections.* Wm. A. Del Mar. (27) Apr. 22.
Improvements on the Motor Cars of the Metropolitan West Side Elevated Railway Company, Chicago.* (17) Apr. 22.
A New Single-Phase Railway Equipment.* A. Frederick Collins. (19) Apr. 22.
Opening of the Electric Railway System in Manila, P. I. (17) Apr. 29; (19) Apr. 29.
Car-Shop Methods. John D. Fish. (Paper read before the Iowa St. and Interurban Ry. Assoc.) (17) Apr. 29.

*Illustrated.

Railroad, Street—(Continued).

Rural Railways. F. McDonald. (Paper read before the Iowa St. and Interurban Ry. Assoc.) (17) Apr. 29.
Street Railway Track Construction.* (60) May.

Sanitary.

The Burning of Town Refuse, with Special Reference to the Destructors at Brussels, West Hartlepool, Moss Side (Manchester), and Westminster.* George Watson, M. I. Mech. E. (75) No. 3, 1904.
Refuse Destruction by Burning, and the Utilization of Heat Generated.* C. Newton Russell. (75) No. 3, 1904.
The Combination of Dust Destructors and Electricity Works Economically Considered.* W. P. Adams, M. I. E. E. (77) Vol. 34, Pt. 2.
The Heat Unit in the Art of Heating. Hugh J. Barron. (70) Apr.
The Science of Ventilation: The Advantages and Limits of "Natural" and "Mechanical" Systems Compared.* J. D. Sutcliffe. (70) Serial beginning Apr.
Heating, Ventilating and Air Cooling at the New York Stock Exchange.* (14) Serial beginning Apr. 8.
The Cost of Reinforced Concrete Sewers. Walter C. Parmley. (Abstract of Paper read before the Boston Soc. of Civil Engrs.) (14) Apr. 8.
British Refuse Destructors. (13) Serial beginning Apr. 13.
Test of a Meldrum Destructor. (47) Apr. 15.
The Mosman Septic Tanks, Sydney, N. S. W. (14) Apr. 22.
A Modern Ventilating System for the Capitol. Day Allen Willey. (46) Apr. 22.
Utilizing Waste Steam in Shops: Method Adopted in the Grand Trunk Shops, Montreal.* (20) Apr. 27.
Electric Sewage-Pumping Stations at Sydney. (14) Apr. 29.
Sanitary Engineering Work in a Large Residence.* (14) Apr. 29.
Das Biologische Reinigungsverfahren. Attilio Rella. (53) Mar. 31.

Structural.

Preliminary Plans and Estimates of Cost of a Central Power Station for Existing and Projected Government Buildings at Washington, D. C.* (70) Serial beginning Apr.
The Hydraulic and Plumbing Installations in the Hippodrome Building, New York.* (70) Apr.
The Inspection of Electrical Conductors, With Especial Reference to Fire Protection. Washington Devereux. (3) Apr.
Reinforced Concrete Residence at Port Antonio, Jamaica Island.* (14) Apr. 8.
Tests of Carey Roofing. (14) Apr. 8.
The Weehawken Elevator of the New York Central & Hudson River R. R.* J. C. Irwin. (14) Apr. 8.
Results of Tests of Common Building Brick for the Bureau of Buildings, New York City. Ira H. Woolson. (13) Apr. 13.
Regulations of the Bureau of Buildings, Borough of Manhattan, for the Testing of New Materials of Construction. (13) Apr. 13.
An Expert Report on the Collapse of Buildings in New York City. (13) Apr. 13.
The Design of Reinforced Concrete Floors.* H. Alexis d'O. Saubrey. (14) Apr. 15.
Practical Notes on Concrete Manipulation.* Charles A. Matcham, M. Am. Soc. C. E. (Extracts from Paper read before the National Builders' Supply Assoc.) (14) Apr. 15.
The Reinforced Concrete Pugh Power Building, Cincinnati.* (14) Apr. 15.
A Reinforced Concrete Roof with a Clear Span of More Than One Hundred Feet.* L. J. Mensch. (13) Apr. 20; (14) Apr. 29.
Detailing Steelwork for Buildings. A. F. Gordon. (From *Rose Technic.*) (14) Apr. 22.
The Belmont Park Steel Grandstand.* (14) Apr. 22.
The Concrete Amphitheater at Berkeley, Cal.* Enos Brown. (46) Apr. 22.
Notes on Cement Testing. William Purves Taylor. (62) Apr. 27.
Details of Reinforced Concrete Work in the Harvard Stadium.* (13) Apr. 27.
Methods and Cost of Creosoting Timber. Oswald T. Dunn. (From *The Polytechnic.*) (13) Apr. 27.
Test of Reinforced Concrete Floor Slabs, Beams and Girders at Frankford, Pa.* (60) May.
Détermination de la Porosité des Mortiers au Moyen de Leur Composition Chimique et de Leur Densite Apparente. M. Maynard. (36) Mar. 25.
Chapelle en Béton Armé de l'Académie Navale des Etats-Unis, á Annapolis.* Henri Kampmann. (33) Apr. 1.
Influence des Variations de Forme de l'Entaille dans les Essais de Fragilité.* F. Barbier. (33) Apr. 1.
Calcul des Parois des Silos a Grains. Alexandre Sée. (33) Apr. 8.
Influence des Sulfates sur la Prise du Ciment. Louis Périn. (33) Apr. 15.
Ueber den Einfluss der Schubfestigkeit und der Armierung auf die Bruchgefahr in Gedrückten Steinprismen. R. Saliger. (81) Serial beginning Pt. 5, 1904.
Die Britischen Normen für die Einheitliche Prüfung von Portland-Zement. (78) Serial beginning Apr.

*Illustrated.

Structural—(Continued).

Stützenmoment des Kontinuierlichen Eisenbetonbalkens. O. Gottschalk. (78) Apr.
Die Anwendbarkeit des Phenolphtaleïns in der Chemie des Portlandzementes. W. Richter. (80) Apr. 1.
Eine Phase aus dem Kapitel "Gusseisenprüfung."* Jüngst. (51) Apr. 1.
Die Baukonstruktionen auf der Weltausstellung in St. Louis.* E. Probst. (82) Serial beginning Apr. 1.
Bericht über Weitere Untersuchungen über die Ausblühungen von Ziegeln. H. Mäckler. (Paper read before the Deutscher Verein für Ton-, Zement- und Kalkindustrie E. V.) (80) Apr. 4.
Bericht des Ausschusses über Einheitliche Kalkprüfung. (Deutscher Verein für Ton-, Zement- und Kalkindustrie Committee E. V.) (80) Apr. 15.
Zur Kenntnis der Streckgrenze. C. Bach. (48) Apr. 15.
Das Neue Geschäftshaus der "New York Times" in New York City.* (82) Serial beginning Apr. 15.
Ueber Zweckentsprechende Ziegelformen, zum Feuersicheren Ausbau von Wohn- und Geschäftshäusern.* Prof. Gary. (Paper read before the Deutscher Verein für Ton-, Zement- und Kalkindustrie E. V.) (80) Apr. 18.
Hennebiquedecke mit Stützenanordnung für 5 000 kg/qm. Reine Nutzlast.* R. Wortmann. (51) Apr. 19.
Ueber den Gleitwiderstand und die Haftfestigkeit Einbetonierten Eisens. Prof. Mörsch. (51) Apr. 19.
Graphostatische Untersuchungen der Plattenbalken auf Grudlage der Preussischen Normen. P. Weiske. (80) Apr. 22.

Topographical.

Surveying. Officers of the United States Coast and Geodetic Survey. (54) Vol. 54, Pt. B.
Surveying.* Officers of the United States Geological Survey. (54) Vol. 54, Pt. B.
The Stadia-Intersection Method for Topographical Surveys.* L. E. Ashbaugh. (4) Apr.
Establishing Grades and Monuments in Small Towns. Ralph B. Slippy. (Abstract from *Proceedings* of the Iowa Eng. Soc.) (13) Apr. 27.
How Hydrographic Charts are Made.* (46) Apr. 29.
Use of Railroad Rail as a Rod Support in Leveling. (14) Apr. 29.

Water Supply.

Irrigation in the United States.* Elwood Mead, M. Am. Soc. C. E. (54) Vol. 54, Pt. C.
Irrigation and Hydraulic Motors Used in Irrigation in France. Paul Lévy Salvador. (Tr. from the French by Paul A. Seurot, M. Am. Soc. C. E.) (54) Vol. 54, Pt. C.
Irrigation in the Hawaiian Islands. M. M. O'Shaughnessy, M. Am. Soc. C. E. (54) Vol. 54, Pt. C.
Irrigation under British Engineers. *Sir* Hanbury Brown. (54) Vol. 54, Pt. C.
Irrigation in Java.* J. E. de Meyier. (54) Vol. 54, Pt. C.
Hydro-Electric Power Development and Transmission in California. Robert McF. Doble. (1) Mar.
Water-Power Plant for a Cordite Factory in India.* (12) Mar. 31.
Wooden Stave Pipe.* W. C. Hawley. (58) Apr.
The 36 000-Volt Hydro-Electric Installation of the Cellina (Italy).* Enrico Bignami. (26) Apr. 7.
Headworks of the Plant of the Toronto & Niagara Power Co., Niagara Falls.* (14) Apr. 8.
Largest Electric Water Power in Maine.* (27) Apr. 8.
The Water and Electric Power Plant of the Utah Sugar Company.* W. P. Hardesty. (13) Apr. 13.
The Gersthofen Hydro-Electric Power Station.* (12) Apr. 14.
Syphons for Diversion of the River Bresle at Treport.* (12) Apr. 14.
Diagram for Power Pipes.* (14) Apr. 15.
Ice at the Intake of the St. Louis Water Works.* Edw. E. Wall. (14) Apr. 15.
New Designs of Rotary Pumps.* (47) Apr. 15.
The Opening of the New Croton Reservoir.* (46) Apr. 15.
Impulse and Reaction Turbines.* (From *Machinery.*) (19) Apr. 15.
The New Artesian Water Supply of Ithaca, N. Y.* F. L. Getman. (13) Apr. 20.
2 700 Horse-Power Turbo-Alternator.* (12) Apr. 21.
Note on the Theory of Unsymmetrical Masonry Dams.* W. C. Unwin. (11) Apr. 21.
Reconstructing an Earth Dam at Worcester.* (14) Apr. 22.
A Reinforced Concrete Filtration Plant at Marietta, Ohio.* (14) Apr. 22.
The Water Supply of Amsterdam, Holland.* W. P. Mason. (13) Apr. 27.
The Irrigation Project of the Canadian Pacific Railway.* (13) Apr. 27.
Characteristics of Two Companion Streams of the Plains.* E. C. Murphy, Assoc. M. Am. Soc. C. E. (13) Apr. 27.
A Hollow Reinforced Concrete Dam at Schuylerville, N. Y.* (13) Apr. 27.
Construction, Repairs and Subsequent Partial Destruction of the Arizona Canal Dam, Near Phœnix, Ariz.* H. F. Robinson. (13) Apr. 27.

*Illustrated.

Water Supply—(Continued).

A Device for Collecting Samples of Water from Various Depths.* W. L. Butcher, Assoc. M. Am. Soc. C. E. (13) Apr. 27.
Harnessing the Victoria Falls for Electrical Power.* (46) Apr. 29.
A Norwegian Hydro-Electric Plant.* T. Norberg Schulz. (27) Apr. 29.
Experimental Work With Wells at Battle Creek. W. W. Brigden. (From *Proceedings* of the Michigan Eng. Soc.) (14) Apr. 29.
A Compact Belt-Driven Pump.* (13) May 4.
Wasserstoss und Stossfreie Bewegung des Wassers.* H. Krey. (81) Pt. 5, 1904.
Ueber Freigehende Pumpenventile.* L. Klein. (48) Apr. 15.
Die Mittlere Profilgeschwindigkeit in Natürlichen und Künstlichen Gerinnen. Johann Hermanek. (53) Apr. 21.

Waterways.

The Concurrent Development of Traffic on Improved Waterways and on Railroads.* Edward P. North, M. Am. Soc. C. E. (54) Vol. 54, Pt. B.
The Lighting of the Coasts of France.* C. Ribière. (Tr. from the French.) (54) Vol. 54, Pt B.
Coast Lighting in Great Britain. Thomas Matthews, M. Inst. C. E. (54) Vol. 54, Pt. B.
Coast Lighting in the United States. D. W. Lockwood. (54) Vol. 54, Pt. B.
Dredges. Their Construction and Performance: Review of General Practice.* A. W. Robinson, M. Am. Soc. C. E. (54) Vol. 54, Pt. C.
Dredges. Their Construction and Performance: Review of General Practice. Jean Hersent. (Tr. from the French by Paul A. Seurot, M. Am. Soc. C. E.) (54) Vol. 54, Pt. C.
Crane and Ladder Dredges.* T. Kobayashi. (54) Vol. 54, Pt. C.
Hydraulic Dredging on the Mississippi River.* F. B. Maltby, M. Am. Soc. C. E. (54) Vol. 54, Pt. C.
Dredging Ocean Bars.* J. C. Sanford. (54) Vol. 54, Pt. C.
Middlesbrough Dock Electric and Hydraulic Power Plant.* Vincent L. Raven, M. I. Mech. E. (75) No. 3, 1904.
Inland Navigation in Egypt.* *Sir* Hanbury Brown. (12) Serial beginning Mar. 31.
The Steel and Concrete Wharf at Tampico.* (14) Apr. 8.
Improvements in English Lighthouses.* (12) Apr. 14.
The Manufacture of Concrete Blocks for the New York Sea Wall.* (14) Apr. 15.
A New Plan for the Panama Canal.* (14) Apr. 22.
Le Nouveau Port du Rosario dans la République Argentine.* Georges Hersent. (32) Jan.
Batardeaux en Béton Armé pour Écluses de Navigation et Autres Ouvrages.* Tricon. (36) Mar. 25.
Les Améliorations du Port de Liverpool.* Brysson Cunningham. (33) Apr. 1.

*Illustrated.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

June 7th, 1905.—The meeting was called to order at 8.30 P. M.; President Schneider in the chair; Chas. Warren Hunt, Secretary, and present, also, 108 members and 17 guests.

The minutes of the meetings of May 3d and 17th, 1905, were approved as printed in the *Proceedings* for May, 1905.

A paper by B. R. Leffler, Assoc. M. Am. Soc. C. E., entitled "A Few Points in the Design of Reinforced Concrete Arches" was presented by the Secretary, who also read a discussion thereon by William Cain, M. Am. Soc. C. E. The subject was discussed further by James Owen, M. Am. Soc. C. E.

A second paper, entitled "Theory of the Spherical or Conical Dome of Reinforced Concrete or Metal," by William Cain, M. Am. Soc. C. E., was also presented by the Secretary.

The Secretary read a communication from The Technical Society of the Pacific Coast, announcing an Engineering Congress to be held at Portland, Oregon, during the Lewis and Clark Centennial Exposition.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

Lansing Hoskins Beach, Detroit, Mich.
Daniel Webster Cole, Cody, Wyo.
Webster Gazlay, Louisville, Ky.
Edgar Ambler Harper, Kansas City, Mo.
John Richard Savage, Jamaica, N. Y.
George Lewis Swendsen, Salt Lake City, Utah.
Arthur Manning Waitt, New York City.

As Associate Members.

Ralph Norman Begien, Morgantown, W. Va.
Alphonsos Henry Bieler, New York City.
John Whitson Darling, Binghamton, N. Y.
Weston Earle Fuller, Poughkeepsie, N. Y.
John Blake Gordon, Washington, D. C.
Henry Alexander Harris, Oglethorpe, Ga.
Edwin Clapp Hayden, Boston, Mass.
Clarke Nightingale Kast, Little Rock, Ark.
Louis Edgar Lannan, Corry, Pa.
Edward R. Mack, Wilmington, Del.
James George Melluish, Bloomington, Ill.
Charles Howard Paul, Glendive, Mont.
Herbert Allan Rice, South Bethlehem, Pa.
Charles Smith Sheldon, Cincinnati, Ohio.
John Haggerty Shortt, Sarnia, Ont., Canada.
William Theodore Sitt, New York City.
Albert Hale Sylvester, Sacramento, Cal.
Edwin Alexander Taylor, Uxbridge, Mass.
William Edward Wilson, Salt Lake City, Utah.
Bruce Clinton Yates, Lead, S. Dak.
Samuel McCain Young, Lake Providence, La.

As Associate.

John Arnold Ubsdell, St. Louis, Mo.

The Secretary announced:

The transfer of the following candidates, by the Board of Direction, on June 6th, 1905:

From Associate Member to Member.

Theodore Horton, York, Pa.
George Cecil Kenyon, Liverpool, England.
Benjamin Brentnall Lathbury, Philadelphia, Pa.
Elmer James McCaustland, Ithaca, N. Y.
Thomas Forrester McGilvray, Duluth, Minn.
James C. Nagle, College Station, Tex.
Harry Nelson Pharr, Memphis, Tenn.
Charles Milton Spofford, Boston, Mass.
Alexander Miller Todd, Vicksburg, Miss.
Joel Edward Wadsworth, New York City.
Charles William Schrage Wilson, New York City.

The election of the following candidates, by the Board of Direction, on June 6th, 1905:

As Juniors.

Charles Whitney Tillinghast Barker, Aspinwall, Pa.
Robert Huse Brown, New York City.
Julius Reed Hall, Elmira, N. Y.
Horace Parlin Hamlin, Orono, Me.
Edward Hutchins, Millinocket, Me.
Marvin Shiebler, New York City.

The Secretary announced the following deaths:

George Clarke Walker, elected Fellow February 6th, 1873; died April 12th, 1905.

Julius Baier, elected Junior September 7th, 1887; Associate Member June 1st, 1892; Member February 6th, 1901; died May 8th, 1905.

Frank March Haines, elected Member March 1st, 1905; died June 1st, 1905.

Robert Cartwright, elected Member July 10th, 1872; died June 4th, 1905.

Adjourned.

THIRTY-SEVENTH ANNUAL CONVENTION, HELD AT CLEVELAND, OHIO, JUNE 20th, 21st, 22d AND 23d, 1905.

Opening Session, Tuesday, June 20th, 1905.—The meeting was called to order at 10 A. M. by Augustus Mordecai, M. Am. Soc. C. E., Chairman of the Local Committee.

Mr. Mordecai, after a few words of welcome, introduced Mr. Harris R. Cooley, of the Board of Control, of Cleveland, who, in behalf of the Mayor, welcomed the Society to Cleveland.

The President, C. C. Schneider, M. Am. Soc. C. E., after replying to the address of welcome, took the chair and opened the business meeting.

BUSINESS MEETING.

President C. C. Schneider in the chair; Assistant Secretary T. J. McMinn acting as Secretary.*

The Assistant Secretary stated that the first business would be the subject of the formation of local associations of the American Society of Civil Engineers, and presented a report on the subject from the Secretary.†

It was moved by B. R. Green, M. Am. Soc. C. E., and seconded by M. R. Sherrerd, M. Am. Soc. C. E., that the suggestion of the Board of Direction of the plan for the organization of local associations of this Society be approved by this meeting. The subject was discussed, but final action was postponed until the meeting on Thursday, June 22d.

At 12.30 adjourned to Thursday, June 22d, 1905.

BUSINESS MEETING—(*Continued.*)

Thursday, June 22d, 1905.—The meeting was called to order at 10.30 A. M., President Schneider in the chair, Assistant Secretary McMinn acting as Secretary.

The report of the Board of Direction in the matter of the resolutions adopted at the Annual Meeting, January 18th, 1905, relating to the nomination by the Society of members to serve on technical or other commissions was read.‡

It was moved by James Owen, M. Am. Soc. C. E., duly seconded, and carried, that the report be accepted and adopted.

The report of the Secretary on the result of the ballots on time and place for holding the Annual Convention of 1906 was presented by the Assistant Secretary.§

* The Secretary being absent on account of illness.

† See page 273.

‡ See page 320.

§ See page 323.

It was moved by George F. Swain, M. Am. Soc. C. E., that the matter be referred to the Board of Direction, with power.

In amendment, the following resolution was moved by Emil Swensson, M. Am. Soc. C. E.:

"*Resolved,* That the sense of this meeting is that the 1906 Annual Convention of the American Society of Civil Engineers be held at a summer resort having a hotel large enough to accommodate the entire attending membership, and that the time of holding said convention shall be the latter part of May if the place is in the southern half of the United States, and in the first part of June if the place is in the northern half, and

"*It is Further Resolved,* That the selection of the place of meeting be referred to the Board of Direction with power to act under the above resolution."

The subject was then discussed, and the amendment, on being put to vote, was carried.

A report from the Secretary on the International Engineering Congress* was then presented, and Robert Moore, Past-President, Am. Soc. C. E., gave a brief statement as to the work done by the St. Louis Committee in maintaining an engineering exhibit and headquarters for engineers at the St. Louis World's Fair, and announced that the exhibit of the Society had been awarded a Grand Prize, and that a diploma conveying this award would be forwarded to the Society, together with copies of the same for each member who had contributed to the exhibit.

It was moved by Mr. Mordecai, seconded and carried unanimously, that the Assistant Secretary be authorized to send to Mr. Hunt, the Secretary, a telegram expressing the regret of the Convention at his absence and their hope that he would soon regain his usual health.

It was moved by James Owen, M. Am. Soc. C. E., and seconded by L. L. Tribus, M. Am. Soc. C. E., that the thanks of the American Society of Civil Engineers be tendered to the Local Committee, and to the various organizations in the City of Cleveland, who had contributed to the success of the Convention, for their kind and generous courtesies; to the Erie Railroad and to the Lake Shore and Michigan Southern Railroad for their kindness in providing special trains and free transportation for the members; to the Cleveland Electric Railway; the Managers of Luna Park; the Managers of the White City; the Officers of the Country Club; the Officers of the Euclid Club; the Detroit and Cleveland Navigation Company; the Proprietor of the Hollenden Hotel; the Civil Engineers' Club of Cleveland; the Bell Telephone Company and the Long Distance Telephone Company; all of Cleveland, Ohio, for their many courtesies extended to the Society and the individual members during the Convention.

*See page 330.

The discussion of the formation of local associations, postponed from the first meeting, was then taken up, and after some additional remarks Mr. Green's motion was carried.

It was moved by E. L. Verveer, Assoc. M. Am. Soc. C. E., seconded and carried, that, on account of the unfortunate accident on the Lake Shore Railroad resulting in the death of Mr. Charles Wellman and Mr. C. R. Morgan, of the Wellman-Seaver-Morgan Engineering Company, the Secretary be instructed to write to Mr. J. W. Seaver, M. Am. Soc. C. E., Vice-President of the Wellman-Seaver-Morgan Company, expressing the sympathies of the members of this Society.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

June 6th, 1905.—President Schneider in the chair; Chas. Warren Hunt, Secretary, and present, also, Messrs. Bissell, Bowman, Craven, Deyo, Gowen, Knap, and Osgood.

The Secretary announced the election, on May 12th, 1905, of Messrs. Charles Haynes Haswell, and Alexander Mackenzie, as Honorary Members of the Society.

The following Committee was appointed to recommend the award of prizes for the year ending with the publications of July, 1905:

E. D. Leavitt,
J. T. Fanning,
F. C. Kunz.

The resignation of Benjamin Dwight Greene, M. Am. Soc. C. E., was accepted.

Applications were considered, and other routine business transacted. Eleven Associate Members were transferred to the grade of Member, and nine candidates for Junior were elected.

Adjourned.

June 20th, 1905.—10 P. M.—The Board met, as required by the Constitution, at the Annual Convention, Cleveland, Ohio. President Schneider in the chair; Assistant Secretary McMinn acting as Secretary, and present, also, Messrs. Craven, Croes, Davison, Ellis, Gowen, Holman, N. P. Lewis, McDonald, Moore, and Sherrerd.

A communication was presented from Cary T. Hutchinson, Wm. Barclay Parsons, and Max E. Schmidt, Members, Am. Soc. C. E., forwarding a check for $127, the balance of a sum subscribed by friends of the late George S. Morison, Past-President, Am. Soc. C. E., for a portrait of him which has been presented to the Society, and asking that this money be accepted and used in some manner as a further memorial of Mr. Morison.

It was ordered that this sum, with the approval of the donors, be appropriated for the purchase of books, or a series of books of permanent character, under the guidance of the Library Committee; the same to be properly inscribed as a memorial to Mr. Morison.

Other routine business was transacted.

Adjourned.

REPORT IN FULL OF THE THIRTY-SEVENTH ANNUAL CONVENTION, INCLUDING THE BUSINESS MEETING, HELD AT THE HOLLENDEN HOTEL, CLEVELAND, OHIO.

Tuesday, June 20th, 1905.

Meeting convened.

The Thirty-seventh Annual Convention of the American Society of Civil Engineers was called to order by Augustus Mordecai, M. Am. Soc. C. E., Chairman of the Local Committee, at the Hollenden Hotel, Cleveland, Ohio, Tuesday, June 20th, 1905, at 10 o'clock A. M.

Address of Welcome, Aug. Mordecai.

AUG. MORDECAI, M. AM. SOC. C. E.—Mr. President, Ladies and Gentlemen: On behalf of the local members, I have only to say that we are all delighted to see you here and give you a most hearty welcome. We have thought that Cleveland was quite an appropriate place for a convention of civil engineers, for the town was founded by one of the guild, Gen. Moses Cleaveland, who looks down upon you from yonder frame. He must have been a remarkable man, for he was one of those exceptions that we hear of now and then, a civil engineer so honored by his contemporaries that they have handed his name down to posterity. Since about 1800, when he turned the tables on us and found us in the bull-rushes, nourished by the commerce of the Great Lakes, on one side, and the natural deposits of coal, ore and stone, on the other, we have grown to be a vigorous, healthy city, and we think not ill-favored; and we certainly have done our share in the industrial development of the country. For instance, in the refining of oil, everyone instinctively thinks of Mr. Rockefeller; Mr. Brush, one of our citizens, blazed the trail that has been followed by all electrical engineers; one of the first blast furnaces in the country was erected here, and to the energy and ability of the Chisholms and Stones the manufacturers of iron owe a great debt; in transportation, the names of Devereux and Newell are ones to conjure with, and in the whole development of the country we certainly have done our share, more so, I think, than is generally realized.

Many smaller cities are better known than Cleveland. If we were away up north, like Seattle; or on the coast, like San Francisco, with no other city of any size within two thousand miles of us; or at the mouth of a large river, like New Orleans; or the capital of the nation, like Washington; we probably would be better known; and yet they are all smaller cities than ours. It is like dear old Philadelphia that has been overshadowed by the very prosperity it has created.

We have collected on these walls the portraits of the deceased local members of the Society. It is nice to think that they are not forgotten. I think it would be a very happy custom to follow, and one which might be perpetuated at our conventions. The first por-

trait is of Mr. Atwood, a gentleman connected with the Lake Shore Railroad for a number of years; the large one is Mr. George H. Ely, for many years a prominent and influential citizen; the next is Mr. Scowden, the first engineer of the Cleveland Water-Works; the next is Mr. John Whitelaw, who was for many years Superintendent of the Water-Works; on the other side, nearest the wall, is my dear old chief, Mr. Latimer; next is Mr. Sheldon, for many years chief engineer of McNair and Claflin's Bridge Works; and below is Mr. Wellington, who possibly does not strictly belong in the group, but I felt that, if living, he would be so pleased to be with us that I really could not leave him out.

Now, gentlemen, we want you to have a good time, whatever you want to do or see or hear, just let us know and we will arrange it, even if it isn't possible, and we hope that, though being among us really but a few days, when you leave you will feel like the boy in the story, judging from the fun you have had it will seem as many months. (Applause.)

I am sorry to say that our Mayor is not able to be with us. Mr. Cooley, one of the members of the Board of Control, who will welcome you in his place, I now have the pleasure of introducing.

Address of Welcome, H. R. Cooley.

HARRIS R. COOLEY, ESQ.—Ladies and Gentlemen, and Members of the American Society of Civil Engineers.—I regret very much that our Mayor is not able to be present to-day, but he left by train last evening for New York to be by the bedside of his sick mother, who is lying at the point of death, and I know that you will excuse him; but, in his name and in his behalf, and in behalf of the municipality, I desire to extend to you a very hearty welcome, I am sure that our Cincinnati friends will forgive us when we say, to this great metropolis of Ohio.

There is a common social life larger than that of the individuals which compose a city. You will be welcomed by your fellow engineers, but, in behalf of the city at large—this common life of the municipality of nearly a half a million people—I extend to you a cordial greeting as you come within our gates.

We welcome you because of what you are and what you represent of the world's growth and the world's progress. We are so apt to be carried away by the things which we have made. I remember standing under the great bridge of the Firth of Forth, 300 ft. above, a great span of 1 700 ft., a bridge of 50 000 tons of steel, and, somehow, it came to me that it had been erected by human hands, had been conceived by human brains, although it seemed to be a part of the great arm of the sea itself, having been there from the foundation of the world. I stood looking into the Saint Gothard Tunnel, and thought of how that had pierced the very heart of the mountain. These are but the things of the past, that which has been and is to

Address of Welcome (continued).

be accomplished in our own country is even greater than any of these.

Out of the naked earth in a hundred years we have wrought a city, by the aid of human thought and human genius and human power, and we must not forget that the men who conceived and the men who built these buildings are greater than the cities and the railroads which their brains thought out and their hands made.

There is such progress, such outlook in your work, we are but in the beginning of it; you are more and more able to take the forces out of the air and make them serve human kind; you are more and more able to take the richness out of the earth—out of the heart of the earth—that it may serve men; you are able to level the mountains or to build the road and drive the iron horse into the very clouds above the mountains. There are infinite possibilities in your work and in your services to humanity. Somehow, I have been thinking of it to-day. My special work, as Director of Charities and Correction, has brought me in contact with wretchedness and poverty. Every winter there are 30 000 or 40 000 people who suffer from want—the children who brave hunger, and, because of the lack of nourishment, must die, in the midst of all our possibilities.

Somehow, it seems to me that the time must come when all men will serve, when there will be no idlers, rich or poor, when every man will be glad to do his part of the world's work. There are those who are satisfied if we can but relieve the present necessities of those in want; if we could only make these poor wretched ones comfortable, and feed them and clothe them, these philanthropists would be satisfied. I see a larger solution of this American problem of poverty, it is not to be solved around the soup bowl, but in that larger life which you are helping, and which you can make possible.

Formerly, men thought out and built great buildings for their King. They built a bridge that a King might pass over; you are building bridges that this nation of people may pass over. Formerly, they made a great fountain, as at Versailles for Louis XIV, that he might look at it and rejoice; you are reaching miles out into the lake and building a tunnel, and in a thousand homes you are bringing pure water, and even the children of the poorest shall have the opportunity to drink as pure water as can be obtained.

The solution is in this larger service to mankind, it is in this larger possibility of larger human life—that men and women and children shall not simply have the barest necessities of a physical existence, but that they shall have the opportunity to live a life of freedom, comfort and luxury, such as the children of God ought to live—in this world with all its natural opportunities and its possible development of human life.

So I look upon your work, not simply as the building of the rail-

roads and the laying out of the canals, not simply as taking the forces out of the heavens and utilizing them, not simply as taking the richness out of the earth, but as serving mankind and making possible a larger and greater civilization than we have ever dreamed of.

"That coming of the golden year,
When all men's good
Be each man's rule, and universal peace
Lie like a shaft of light across the land,
And like a reign of beams athwart the sea
Through all the circle of the golden year."

We are glad that you came to Cleveland in the month of June; it is the finest month of the year. We are very proud of our city, and he wouldn't be very much of a man who isn't very proud of his own wife. It is a beautiful city; our people do not have to go away in the summer time; it is a summer resort, indeed. Most of our people do not even care to go to Heaven at this season of the year. (Laughter.) We welcome you to our parks and our boulevards, to all that we have in our growing city.

We have great plans, and we trust that you may help us in carrying out our Group Plan, that you may leave a sentiment of larger ideals and larger conception of what a city can be and what our city ought to be.

Emerson has somewhere said that happy is the house that shelters a friend, it might well be built like a festal bower to entertain him a single day. Sometimes when our friends have been in our home and we have entertained them, when they have gone away our homes seem better and richer because they have been present with us; and so we believe that our city will be richer in greater ideals and thoughts and purposes, and have a larger outlook for the future because you have been present with us for these days, and we trust that you may have a happy time.

I think that our local engineers will do their utmost to make it pleasant and full of interest, and we trust that your deliberations may be profitable and helpful to you all, and that you may carry from us a happy and pleasant memory of our fair city by the lake.

Again, in behalf of the Mayor, and in behalf of the municipality, I extend to you the keys of the city and bid you a most hearty welcome. (Applause.)

Reply to Address of Welcome.

CHARLES C. SCHNEIDER, PRESIDENT, AM. SOC. C. E.—Director Cooley: allow me to thank you most heartily for the cordial welcome you have extended to the American Society of Civil Engineers. It is particularly gratifying and appropriate that this welcome should be extended to our Society by the official representative of a Mayor whose name is familiar to all of us; a man whose name is so closely

Reply to Address of Welcome (continued).

identified with engineering, and who, through his many well-known inventions and improvements, has been instrumental in making modern street car traffic what it is to-day.

No more appropriate place could have been selected for a meeting of a representative body of engineers than the Forest City. In this great center of engineering and industrial activities, the objects of interest to the engineer offered by Cleveland are almost unsurpassed by those of any other city, as Cleveland is the second largest manufacturing city on the Lakes, the first Lake port in shipbuilding, and foremost in the country in the manufacture of iron and steel, and many other industries of almost endless variety.

Cleveland has the distinction of being one of the best governed cities in the country, of having the best street car service, and of having succeeded twice in electing a Mayor who is with the people and for the people all the time. (Applause.)

In the programme laid out by your Local Committee, ample facilities have been provided for the members of this Society to view your city, its beautiful streets and parks and lake front, your harbor and docks, and also your means of transportation by rail and water, and to visit many prominent manufacturing establishments for which your city is so famous. You have liberally provided for our entertainment, to make our sojourn a pleasant one, which might have been expected from Cleveland.

We are particularly grateful for the entertainment provided for the ladies, whose influence is felt so powerfully at our Annual Conventions. They make them a success by their presence, as they contribute to the attractiveness of the same so largely. (Applause.)

The Business Meeting convened at the close of this session.

BUSINESS MEETING.

President Schneider in the chair; Assistant Secretary McMinn, acting as Secretary.

The President.—This meeting will now come to order for the transaction of business. The Chair has an announcement to make.

Perhaps many of you have missed a familiar figure who has been for many years at our Annual Conventions, that is, our Secretary, Mr. Hunt. Mr. Hunt regrets very much that owing to illness he is unable to be present; and we, also, regret his absence.

Local Associations.

The Assistant Secretary.—The first order of business will be the subject of the formation of Local Associations of the American Society of Civil Engineers. The following is a report of the Secretary on the subject:

Report on Local Associations.

REPORT OF THE SECRETARY TO THE BUSINESS MEETING OF THE ANNUAL CONVENTION IN RELATION TO THE PROPOSED FORMATION OF LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

"The subject of the formation of Local Associations of the membership of the Society has been set down for discussion at the Annual Convention at Cleveland, and the present state of the matter is given below for the information of Members.

"The following circular note, enclosing suggested By-Laws, was mailed March 7th, 1905, to at least three Members of the Society in each of the following cities, with a request that the suggestion be brought to the attention of Members in their vicinity.

"Albany and Troy, N. Y.	New Orleans, La.
Boston, Mass.	Philadelphia, Pa.
Cleveland, Ohio.	Pittsburg, Pa.
Chicago, Ill.	St. Louis, Mo.
Detroit, Mich.	St. Paul and Minneapolis, Minn.
Kansas City, Mo.	San Francisco, Cal.
Mexico, Mexico.	Washington, D. C.

"VIEWS OF THE BOARD OF DIRECTION AS TO THE FORMATION OF LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS, MARCH, 1905.

"The proposed formation of a Local Association of the Membership of the Society in Washington, D. C., has led the Board to a careful consideration of the desirability of such Associations in all localities in which the membership available for such purpose is sufficient in number.

"The subject of the formation of local chapters of the Society was considered a number of years ago, but nothing was accomplished in this direction, as there developed considerable opposition to the formation of such chapters.

"The present suggestion is understood to have a somewhat different end in view, *viz.*, the formation of local associations of our members for professional and social intercourse only. Similar propositions have been considered somewhat informally by the Board of Direction heretofore, one emanating from members residing in the City of Mexico, and another from St. Louis, although the latter proposition was merely the decision of the question as to whether the present local engineering society of St. Louis could be furnished, upon request, with certain of the Society publications, and allowed to discuss them with the privilege of having such discussion, if valuable, published by the Society. This latter question was decided by the Board in the affirmative, but nothing further has been heard from our members in that city.

"The Board recommends that, wherever possible, steps be taken

Report on Local Associations.

calling the attention of the membership to this matter, and that such Associations be formed.

"In making this recommendation, the Board wishes to point out that associations of this character would be of great advantage to the Profession in general, and would widen greatly the influence of this Society, and enhance its standing in the various communities; that if coincidentally (or practically so) the papers issued in our *Proceedings* could be brought up for discussion at meetings in various localities and the resulting discussion forwarded to the Secretary of the Society for publication, subject to the rules in force in regard to the discussions which now take place in New York, it would result in great advantage to the *Transactions,* and that, in nearly all cases, it would be possible for the author of a paper published by the Society to be within reasonable traveling distance of some point at which his paper is to be read, and give him an opportunity to present it in person.

"It is further believed that if this project can be carried out successfully, it would bring non-resident members into closer touch with all the work of the Society, and place the non-resident member practically in the position of a resident member of the Society in the particular locality in which he lives.

"It is further submitted that the advantages to engineers who are not now members of the Society would be very great, and that the formation of such an association in any city would not interfere in any way with existing local engineering societies or clubs.

"The Board has prepared a draft of proposed By-Laws for such an association (copy enclosed herewith), which, in its opinion, would be satisfactory.

"Referring to this draft, it is believed that the following Articles: No. 1, relating to the Name, Location and Object; No. 2, relating to Membership, and No. 6, relating to Amendments, should in substance be incorporated in the By-Laws of all such associations, but that Article No. 3, relating to Dues; No. 4, relating to Officers, and No. 5, relating to Meetings, may all be varied in detail according to special local requirements or convenience.

"These are inserted in the draft as suggestions for consideration in each special case, although it would be well if, in all matters except the amount of dues, all such associations had exactly similar By-Laws.

"In this connection it should be noted that the Resident Membership of the Society pays an additional fee of $10 per annum for the special privileges of such membership, and that a much less yearly sum would probably suffice for the dues in Local Associations as outlined herein.

"By order of the Board of Direction.
"Chas. Warren Hunt,
"*Secretary.*

"PROPOSED BY-LAWS FOR LOCAL ASSOCIATIONS.

"Art. I. Name, Location and Object.

"(1) The name of this Association shall be the ..... Association of Members of the American Society of Civil Engineers.

"(2) The officers of the Association shall be located in the City of .....

"(3) Its objects shall be the advancement of engineering knowledge and practice, the maintenance of a high professional standing among its members, and the furtherance of the general welfare of the American Society of Civil Engineers.

"(4) Among the means to be employed for these purposes shall be: Meetings for the presentation and discussion of professional papers, particularly those issued by the American Society of Civil Engineers, and the encouragement of engineers who are not members to attend and take part in the professional and social features of such meetings.

"ART. II. MEMBERSHIP.

"(1) The membership of this Association shall be restricted to persons who are members of the American Society of Civil Engineers in any grade and who reside within .... miles of ..... All such may become members of this Association without payment of Entrance Fee, but should the membership in the American Society of Civil Engineers of any person cease from any cause, he shall at the same time cease to be a Member of this Association.

"ART. III. DUES.

"(1) The annual dues payable by all members shall be ....., payable semi-annually in advance on the first days of January and July, and any member whose dues are more than six months in arrears shall cease to be a Member of this Association.

"ART. IV. OFFICERS.

"(1) The officers of the Association shall be a President, two Vice-Presidents, a Secretary, and a Treasurer, who shall constitute a Board of Directors, in which the government of the Association shall be vested.

"(2) The term of office of the President of the Association shall be one year; of the Vice-Presidents, Secretary and Treasurer, two years. The term of each officer shall begin at the close of the Annual Meeting at which such officer is elected, and shall continue for the period above named, or until a successor is duly elected.

"(3) A vacancy in any office shall be filled by election at the next regular meeting of the Association.

"(4) The officers shall be elected at the Annual Meeting of the Association.

"ART. V. MEETINGS.

"(1) The Annual Meeting of the Association shall be held on the third Wednesday of December in each year.

"(2) Regular meetings shall be held monthly, except during the summer months, at such time and place as may be appointed by the Board of Directors. At these meetings the business of the Association shall be transacted, and the discussion of professional papers published by the American Society of Civil Engineers, or specially

Report on Local Associations (continued).

prepared for the occasion, shall be in order. Such discussions may be furnished to the Secretary of the American Society of Civil Engineers for publication, subject to the approval of the Publication Committee of that Society.

"ART. VI. AMENDMENTS.

"(1) This Constitution may be amended only by a two-thirds vote of all members of the Association, which vote may be taken, if necessary, by letter-ballot, provided such amendment shall have previously received the approval of the Board of Direction of the American Society of Civil Engineers."

"The subject seems to have aroused great interest among the Members of the Society generally, and two Local Associations have already been formed.

"**Kansas City, Mo.**—The Kansas City Association of Members of the American Society of Civil Engineers was organized on April 8th, 1905, the following officers being elected:

"President, Daniel Bontecou.

"Vice-Presidents, I. G. Hedrick, S. W. Fox.

"Secretary and Treasurer, C. S. Burns.

"The membership is limited to the membership of the Society residing within 100 miles of Kansas City; the annual dues are not to exceed $10; meetings are to be held monthly, except during June, July and August.

"**San Francisco, Cal.**—The San Francisco Association of Members of the American Society of Civil Engineers was organized on April 28th, 1905, the following officers being elected:

"President, Captain Wm. W. Harts.

"Vice-Presidents, G. E. Gray, C. D. Marx.

"Secretary, F. Riffle.

"Treasurer, A. L. Adams.

"To a circular letter, which was addressed to 79 members living within 100 miles of San Francisco, by Captain Harts, 55 replies were received, all but two of which were favorable to the organization; 29 members were present at the meeting of April 28th, and it is stated by the President that there was considerable enthusiasm manifested. The 100-mile limit for membership was adopted; dues were fixed at not more than $5 per year. The Annual Meeting is to be held on the third Wednesday of December of each year, and regular meetings are to be held bi-monthly.

"**Washington, D. C.**—In this city, where this movement started, there has been much discussion of the subject, but no decision has been reached.

"**Cleveland, Ohio.**—The matter is still under consideration, the reports at present indicate favorable action by our members in that vicinity; the sense of a meeting held on April 11th, 1905, at which 15 were present, was expressed that such an association would be desirable.

"**Pittsburg, Pa.**—It was the intention to have a meeting for the consideration of this matter on May 10th, but, upon the understanding that the whole question would be discussed at the Convention, action has been deferred.

"**Boston, Mass.**—The statement is made that it is the unanimous opinion of those who have been consulted that it would be very difficult to arouse sufficient enthusiasm in Boston and vicinity to result in such an organization.

"**St. Louis, Mo.**—At a meeting of the St. Louis members, held on March 24th, 1905, a resolution was adopted to the effect that it is not desirable at this time to have such an organization in St. Louis. There were 23 members present. There is now a local organization of our members, which has, to date, held 26 meetings, but has never met for the purpose of reading or discussing technical papers, but only for the discussion of business matters in connection with the National Society."

"The following report has been transmitted to the Board of Direction from Philadelphia and vicinity:

"*To the Members of the American Society of Civil Engineers Residing in Philadelphia and Vicinity:*

"A meeting of the members of the American Society of Civil Engineers residing in Philadelphia and vicinity was held at the Engineers' Club of Philadelphia on April 25, 1905, pursuant to a circular issued by Messrs. G. S. Webster, L. Y. Schermerhorn and S. T. Wagner, who had been appointed a committee by the Board of Direction to look into the question of the formation of a local Association of the Society in Philadelphia.

"The meeting, which was attended by thirty-three members, was called to order by Director Webster. Mr. C. C. Schneider, President of the Society, was called to the chair, and Mr. S. T. Wagner was elected Secretary.

"The letter from Secretary Hunt, advising the members of the committee of their appointment, was read by the Secretary as well as the views of the Board of Direction on the subject and the proposed By-Laws. Letters from sixteen members who were unable to be present were also read. After a general discussion it was, on motion of Mr. R. L. Humphrey,

"*Resolved,* That a Committee, composed in part of members of the Engineers' Club of Philadelphia, be appointed by the chair to secure by letter ballot the opinion of the members of the American Society of Civil Engineers residing in Philadelphia and vicinity on

Report on Local Associations (continued).

the proposition of forming a local Association of the members of the American Society of Civil Engineers in Philadelphia and to transmit the same to the Board of Direction of the Society.

"On motion, the number of members on the Committee was fixed at five.

"The Chair appointed Messrs. Edgar Marburg, H. G. Morris, L. Y. Schermerhorn, S. T. Wagner and G. S. Webster.

"In connection with the ballot herewith enclosed the Committee desires to submit briefly such statements for and against the proposal as may in its judgment be of assistance in reaching a conclusion.

"The subjoined statements in favor of the proposal are suggested in part by a circular letter addressed to the members of the original local committee, embodying the 'Views of the Board of Direction as to the Formation of Local Associations of Members of the American Society of Civil Engineers.'

"1. Such associations might be of advantage to the profession, and increase the standing and influence of the Society.

"2. The publication in the *Transactions* of the discusssion of papers before local associations might result in advantage to the *Transactions*.

"3. If the author of a paper be within reasonable traveling distance of a point at which his paper is to be read, it might give him an opportunity to present it in person.

"4. Such associations would bring non-resident members into closer touch with the work of the Society, and would offer added inducements to engineers to become members of the Society.

"Opposed to the proposition it may be suggested:

"1. The formation of local associations for the discussion of papers published in the *Proceedings* may be considered superfluous, on the ground that adequate provision exists now for written discussions and that verbal discussions are relatively of little value.

"2. Activity on the part of a local association in procuring papers would place it in direct competition with the Engineers' Club of Philadelphia and the Engineering Section of the Franklin Institute.

"3. In view of the existence of the Engineers' Club of Philadelphia and the Engineering Section of the Franklin Institute, it may be doubted whether sustained interest would be taken in a third local association devoted to engineering.

"4. The total membership of the American Society of Civil Engineers in Philadelphia and vicinity is 154, of whom 123 are residents of Philadelphia. Assuming that 100 members would join a local association, the annual dues, in the judgment of the Committee, would be not less than $10.00, and probably more. It should be stated in this connection that the resident members in New York are now subjected to additional dues of $10.00 per annum as compared with those of non-resident members, and further that it is the sense of the Board of Direction of the American Society of Civil Engineers 'that the Society should pay for stenographic reports of meetings at which there is a discussion on papers which have been published by the Society, subject to such regulations as the Board of Direction may from time to time adopt.'

"Members are requested to fill out, sign and mail promptly to Edgar Marburg, University of Pennsylvania, Philadelphia, the enclosed ballot slip. The ballot will be canvassed on May 30th.

"Respectfully submitted,

"EDGAR MARBURG,
H. G. MORRIS,
L. Y. SCHERMERHORN,
SAMUEL T. WAGNER,
GEORGE S. WEBSTER."

"To the Members of the American Society of Civil Engineers residing in Philadelphia and vicinity:

"Sixty-two (62) ballots were cast out of a possible total of 156 on the proposition of forming a local Association of the American Society of Civil Engineers. The answers to the three questions submitted may be classified as follows:

	YES.	NO.	DOUBTFUL.	TOTAL.
"Are you in favor of the formation of a local Association?.....	14	42	5	61
"If such an Association be formed:				
(*a*) Will you be willing to join, provided the dues do not exceed $10.00 per annum?.....	31	18	5	54
(*b*) Will you be disposed to participate actively in the furtherance of its interests?.....	19	26	3	48

"A copy of these returns and of the circular issued in connection with the ballot will be forwarded to the Board of Direction of the American Society of Civil Engineers.

"Respectfully submitted,

"Local Committee: EDGAR MARBURG, H. G. MORRIS, L. Y. SCHERMERHORN, S. T. WAGNER, G. S. WEBSTER."

"The following letter has also been received:

"SAN FRANCISCO, June 13, 1905.

"MR. CHAS. WARREN HUNT,
"Sec., Am. Soc. C. E.,
220 West 57th St., New York, N. Y.

"DEAR SIR:—I know you will be interested to learn that the first regular meeting of the San Francisco Association of members of the Am. Soc. of C. E. was held at the Palace Hotel on the evening of June 10th, and that it was an unqualified success. The regular meeting was preceded by an informal dinner at which thirty members and six guests were present.

"After a short intermission the meeting was called to order by Prof. C. D. Marx, Vice-President. The minutes of the preliminary meeting of several weeks ago were read and approved, after which

Report on Local Associations (continued).

letters of regret from President Harts and Mr. Wallace were read, these gentlemen having been called away from the city by urgent business. A letter from yourself to Captain Harts was also read.

"The reading of letters from two members of the American Society residing outside the Constitutional limit of one hundred miles from San Francisco led to the unanimous adoption of a resolution instructing the Secretary to submit to a letter ballot, the question of amending Article Two of the Constitution by eliminating the clause 'And who reside within one hundred miles of San Francisco'; the adoption of this amendment will have the effect of making any member of the American Society in any grade eligible for admission to our Association regardless of residence.

"After a brief introductory address by Vice-President Marx, Mr. Washburn, M. of Am. Soc. C. E. from Nashville, and Mr. Burns, Secretary of the Kansas City Association, each addressed the meeting.

"Although the program for the evening as arranged by the Board of Directors contemplated the discussion of several recent papers published in the *Transactions*, the paper entitled 'Water-Works of Porterville' by P. E. Harroun proved to be of so much interest to the members that its discussion occupied the entire evening. This paper was discussed by Messrs. Harroun (the author), Wing, Amweg, Marx, Duryea, Hale, Soule, Washburn, Phillips, Adams and Boggs.

"I may add in conclusion that the meeting was enthusiastic from beginning to end and that the interest displayed by those in attendance exceeded the most sanguine hopes of Captain Harts and the writer. It is but fair to state that although Captain Harts was unable to be present, the success of our first meeting was largely due to the intelligent and energetic methods employed by him in interesting the local members of the American Society in the new enterprise.

"With kind regards and with best wishes for the success of the Cleveland Convention, I am,

"Sincerely yours,

"F. Riffle,

"*Secretary,*

"*San Francisco Association,*

"*Members, Am. Soc. C. E.*"

"The following report has been received from Messrs. Chanute, Modjeski, and Strobel, in regard to the formation of such an Association in Chicago:

"Chicago, June 1, 1905.

"To the Board of Direction.

"*Am. Soc. C. E.*, 220 W. 57th St., New York.

"Dear Sirs:—We have the honor to submit the following reply to the Secretary's letter of March 10, 1905, which letter was accompanied by a statement of your views in reference to 'the formation of local associations of members of the Am. Soc. C. E.,' and by a draft of suggested by-laws for such associations.

"Before preparing this reply, we have conferred with each other

and with such resident members as were thought to be possessed of representative opinions.

"Our conclusions are unanimous that the time has passed when it might have been practicable to organize such local association or chapter in Chicago.

"We admit that there would be advantages, but the disadvantages, in our opinion, now largely outweigh them. The following is a brief statement of these disadvantages:

"There are 120 Members and Associate Members, Am. Soc. C. E., in Chicago and immediate vicinity. Of these, 78 are also members of the Western Society of Engineers, which, in all, counts 725 members. To these 78 members the local society offers facilities for the presentation and discussion of papers before a large membership, including nearly two-thirds of the local membership of the Am. Soc. C. E. It offers a commodious and central reading-room containing all the important engineering periodicals, a well-stocked library, a meeting and a lounging room, and the services of a paid secretary, whose entire time is given to the society. A local chapter of the Am. Soc. C. E. could not hope to offer similar facilities.

"Of the 71 members Am. Soc. C. E. some would not join on account of the additional expense. Others would not be willing to resign from an established and prosperous local society, which they have helped to build up, to join a chapter of doubtful expediency and appearing to offer no important advantages. The chapter would be considered antagonistic to the local society and to detract from the usefulness of the latter, and to join it, would, to many, appear to be an act of disloyalty to the latter. Of the 43 local members Am. Soc. C. E. not members of the W. S. E., some take little or no interest in society matters and have joined the Am. Soc. C. E. only on account of the prestige that attaches to membership. Most of these would not be inclined to join a chapter, otherwise they would have joined the W. S. E. On the whole, therefore, the membership of the chapter, since such membership would be 'restricted to persons who are members of the Am. Soc. C. E.' would be very small and interest therein could not be maintained.

"The formation of such an association would create two classes among members of the Am. Soc. C. E., viz: those who are members of the local chapter and those who are not. This might disturb unity and good fellowship among local members. It might result in some resignations of members of the Am. Soc. C. E., who for some reason did not join the chapter.

"The local engineering societies as they exist seem to satisfy local needs. They are generally organized along the same lines and the plan followed may reasonably be assumed to fit the requirements. They manage their own affairs, and this satisfies the desire for a fair degree of independence usually felt. A chapter, on the other hand, would suffer from its lack of independence. Sectional jealousies might become aroused and impair the allegiance to the parent Society and the good feeling which now so happily exist.

"Respectfully,

"O. Chanute,
Ralph Modjeski,
Charles L. Strobel."

"Nothing definite has been heard from Albany and Troy, Detroit, City of Mexico, New Orleans, St. Paul and Minneapolis, Minn.

"Respectfully submitted,

"CHAS. WARREN HUNT,
"Secretary."

THE PRESIDENT.—This matter is now open for discussion.

Discussion on Local Associations.

JOHN C. TRAUTWINE, JR., ASSOC. AM. SOC. C. E.—At first sight, the proposition, looking to the formation of local associations of members of the American Society of Civil Engineers, has everything to commend it, and we can all readily admit the advantages claimed for it.

But, opposed to such a movement, there is one consideration, which, it seems to me, outweighs these advantages, if said associations are to engage in the professional business of preparing, reading and discussing papers; and that consideration is the existence, in each center where such an association might be successfully formed, of a local organization for that very purpose, or at least of a body of engineers, considerably larger than the local membership of the American Society, comprising a large proportion of that membership, and ready, or nearly ready, to be formed into a local engineering society.

With such local society the proposed local chapter of American Society members must come into unfortunate and unprofitable rivalry.

The Engineers' Club of Philadelphia is a thriving organization, of some five hundred members, and the Engineering Section of the Franklin Institute is a smaller body, existing for similar purposes. There is thus, in Philadelphia, already one such organization too many; for either an engineer must decline membership in one or other of these bodies, thus depriving it of his membership, or else he must divide his interest between the two, thus depriving each of them of part of that interest while burdening himself with membership in two bodies, where one should have sufficed.

Now the formation, in Philadelphia, of a local association of members of the American Society of Civil Engineers, for the production of professional papers, would simply add one more to a number already too great by one.

Of the 180 American Society members, of all grades, residing within a radius of 50 miles from Philadelphia, probably not more than 50% are sufficiently interested in society matters to join the local association; and, of these, most, if not all, would be found already belonging to the Engineers' Club or the Engineering Section of the Franklin Institute.

Assuming that half of the 180 Philadelphia American Society

members joined the local association, and that from one-third to one-half of those joining attended the meetings, we would have an average attendance of from 30 to 45, whereas, at the meetings of the Engineers' Club of Philadelphia, the attendance is usually from 70 to 100.

The formation, in Philadelphia, of a third engineering society would therefore result merely in an opposition, and a feeble opposition, to the two existing organizations. The new, or third, society would necessarily be composed largely of men belonging to one or both of the existing societies.

But the principal reason for my lack of enthusiasm respecting the proposed movement, lies deeper than this. Such lack of enthusiasm might readily be mistaken for narrow jealousy of the American Society and for an insular resentment against any encroachment, by the national society, upon the local territory; but, so far is this from being my own case that it is precisely the opposite consideration which forms my motive in dissenting from the present movement.

Deeply impressed, as I am, with the advantages of wider co-operation, I have, for eleven years, been combating that narrow identity-worship which has led some of our largest local societies to refuse co-operation with the Association of Engineering Societies, and thus to sacrifice the welfare of the profession at large rather than imperil their particular local identities.

As a member, both of the Franklin Institute and of the Engineers' Club, and proud of the distinction attained by each, I should rejoice in any proper unification of these two bodies, believing that such unification would result, not only in benefit to the two societies concerned and to their members, but to the profession as a whole.

Similarly, I should rejoice to see some form of co-operation and even of union between the American Society of Civil Engineers and (for instance) the Engineers' Club of Philadelphia; for I believe that this would result in the greatest good to the greatest number, even though the "identity" of the local society should suffer by the process; and it is for just this reason that I cannot feel enthusiastic over the present movement; which, it seems to me, must tend to estrange the existing local societies from the national society, and, therefore, to defer the day when these local societies, with their great and growing memberships, shall themselves become local chapters of the American Society, to its very material benefit.

Rather than antagonize the local societies by setting up a rivalry to them, let us invite conferences with them, to see whether some form of co-operation, or even of union, with them, may not be effected.

Discussion on Local Associations (continued).

The obvious difficulty, in the way of bodily absorption of the local societies by the American Society, is the fact that the conditions of membership, in the local societies, are usually less exacting than those properly maintained by the American Society; but, if once the advantages of a wider co-operation were appreciated, this difficulty would doubtless find easy solution, possibly in the creation, by the American Society, of additional and lower grades of membership (of course with restricted privileges) analogous to the grade of "Student" in the Institution of Civil Engineers.

If the proposed local associations of members of the American Society are to be mere social organizations, their formation is by all means to be encouraged; but, if they are to antagonize existing local bodies by forming rival local engineering societies, with separate officers, separate dues and competing activities, their formation will, I fear, hinder, rather than forward, the object we all have at heart, the healthy growth and development of the American Society of Civil Engineers. (Applause.)

The President.—Any other discussion?

Morris Knowles, M. Am. Soc. C. E.—I have been asked by the chairman of the meeting of the local members of the American Society of Civil Engineers, held at Pittsburg, to speak of the minutes of that meeting. This meeting was held March 29th, 1905; thirty-four members of the American Society of Civil Engineers were present, a majority of whom were members of the local engineering society. Mr. Davison will give a statistical statement in reference to the representation present.

"Minutes of Meeting of Pittsburg Members of the American Society of Civil Engineers, held March 29th, at the Rooms of the Engineers' Society of Western Pennsylvania.

"Present: W. C. Hawley,
H. S. Prichard,
Willis Whited,
R. A. Cummings,
E. K. Morse,
J. A. Atwood,
Gaylord Thompson,
L. J. Riegler,
T. D. Lynch,
E. D. Harshbarger,
C. L. Wilcox,
A. W. Whitson,
P. Bryan,
J. E. Banks,
T. H. Wiggin,
H. B. Rust,
Frans Engstrom,
L. J. Affelder,
W. G. Wilkins,
L. H. Shoemaker,
J. G. Gudmundsson,
O. R. Pihl,
G. J. Walker,
Herman Laub,
Fred. E. Field,
H. W. Underwood,
Thos. Johnson,
George S. Davison,
F. J. Wilkinson,
Emil Swensson,
J. W. Walker,
Morris Knowles,
Geo. T. Barnsley,
J. C. Chester.

"Total, 34.

"Meeting called to order at 8:05, P. M., and, on motion of Mr. Geo. S. Davison, Mr. Jesse W. Walker was chosen chairman of the meeting and Morris Knowles chosen as secretary.

"Chairman called upon Mr. Davison to explain reason for the call for the meeting, who stated that he had sent out 135 postal cards to members of all grades in Pittsburgh and vicinity. He read a letter from the Secretary of the American Society of Civil Engineers, Mr. Hunt, also a circular letter expressing the views of the Board of Direction, and a draft of proposed by-laws, as drafted by the Board of Direction of the American Society.

"A general discussion followed, participated in by Messrs. W. G. Wilkins, E. K. Morse, Emil Swensson, R. A. Cummings, L. J. Affelder, J. A. Atwood and Thos. Johnson, who generally expressed the belief that the formation of such a local chapter was unwise and would detract from the efficiency and interest in the meetings of the Engineers' Society of Western Pennsylvania.

"Messrs. Willis, Whited and Frans Engstrom spoke in favor of such organization of a local chapter.

"On motion of Mr. Johnson, an expression of opinion was taken as to whether the organization of such local chapter would interfere with the work of the Engineers' Society of Western Pennsylvania; the vote being 13 in the affirmative and 11 in the negative.

"On request of Mr. Swensson, Mr. Barnsley was appointed by the Chair to secure a list of members present for registration.

"Mr. Davison moved that a committee of five be appointed by the Chair to consider the whole matter and report back; one member of the Committee to be strongly in favor of the motion and one decidedly against the same, and the third member to be chosen by the other two, in conference with the President. After some discussion, the motion was changed, and, with the approval of the seconder, to have the Committee consist of five members, and, on suggestion of Mr. Swensson, the Committee was asked to send out a circular letter containing all information about the movement and request answers which should be considered in its report.

"The motion to appoint a committee was carried, the committee to report at a meeting to be held May 10th, and, on further motion, the meeting was adjourned.

"MORRIS KNOWLES,
"Secretary."

The following is a copy of a circular, explaining why no meeting was held on May 10th:

"NOTICE TO LOCAL MEMBERS OF AMERICAN SOCIETY OF CIVIL ENGINEERS.

"At a meeting of the Local Members of the American Society of Civil Engineers, held at the rooms of the Engineers' Society of Western Pennsylvania on March 29th, 1905, the question of whether or not the local members of the Society should form a Chapter was referred to a Special Committee for investigation and report. This Committee was to report to an adjourned meeting to be held May

Discussion on Local Associations (continued).

10th, 1905. The Committee has met and thoroughly discussed the advisability of the formation of a Local Chapter, and has consulted in an informal way with the Board of Directors of the Society.

"It has been thought that the questions involved in the formation of a Local Chapter of the Society are so important, and there are so many arguments for and against such formation that it seems best to make the question one of discussion at the Convention to be held in Cleveland in June.

"The Local Committee, therefore, believes that it is not necessary that the Local Members should meet for a further consideration of this matter until after more information is made available and, therefore, suggest that no meeting be held on May 10th.

"GEO. S. DAVISON,
"*Chairman, Local Committee.*"

"MAY 6TH, 1905."

Mr. Davison explained the attitude of the Board of Direction in the matter, as given in the communication from the Secretary, Mr. Hunt. Among other things, a vote was taken on a motion of Mr. Johnson calling for an expression of opinion as to whether the formation of such a local chapter would interfere with the activities of the Engineers' Society of Western Pennsylvania. This vote was 13 in the affirmative and 11 in the negative.

After a further discussion, it was moved that a committee of five be appointed by the Chair to consider the whole matter and report back at a meeting to be held on May 10th. This committee consisted of Mr. Davison, Chairman; Mr. Swensson, Mr. Morse, Mr. Whited and Mr. Barnsley. This committee has held meetings and a circular was issued, at the request of the committee, explaining that it was not desirable to hold a meeting on May 10th, as the committee had not sufficient information at its command and it would be better to defer the whole matter, as a discussion would be held at the Annual Convention of the American Society at Cleveland. Therefore the committee is still to report to the members. Mr. Davison will tell you something about what the local committee has done.

GEORGE S. DAVISON, M. AM. SOC. C. E.—There are 122 members, in all grades, of the American Society of Civil Engineers in and about Pittsburg. Of these, 60 are members of the Engineers' Society of Western Pennsylvania. Fully half of the latter take a very active interest in the affairs of the local society. On the other hand, I believe I am correct when I say that but very few of the 62 members of this Society who are not members of the local society have ever taken an active interest in the American Society's affairs.

In the appointment of the committee of five, to which Mr. Knowles has referred, the chairman selected three men who were understood to be favorable and two unfavorable to the "local chapter" idea.

This committee met and discussed matters very fully, with the result that they were all convinced that a local chapter of the American Society in Pittsburg was not only impractical, but, if it were attempted, one or the other of the societies in which so many of us are jointly interested would be injured thereby. I can shorten my story a great deal by saying that the views of the Chicago Committee, as read here, fully express those of our committee; they are identical.

Our committee concluded to await information to be had from the Society at large before reporting back to the meeting by which they were appointed, but, meanwhile, I am convinced that our Pittsburg membership will be generally opposed to the idea. There is a very strong sentiment, however, in favor of our getting together once or twice a year in a social way, which, if done, will undoubtedly be a benefit to those who will attend such social meetings, and this Society as well. We can muster anywhere from 125 to 150 members at such gatherings, and by becoming better acquainted with each other we may awaken a very great interest in the Society. While we may be opposed to a local chapter among ourselves, we are not opposed to the plan being inaugurated in other communities. It may work all right at Kansas City, where they have no local society, and it may even prove successful in San Francisco, where they have one. Each community should decide this question for itself, but it were better that it be not attempted if those taking the initiative are not fully aware of the hard work that is involved in holding interest in such movements.

Oberlin Smith, M. Am. Soc. C. E.—The speaker, though born in Ohio and spending his youth in this beautiful town, has not seen much of it for forty years. He resides in New Jersey, where his town is too small to have a local chapter, and, therefore, cannot talk from actual experience on this matter. Doubtless the influence of this Society all over the country would be greater and stronger with local chapters of some kind. It seems, however, from the documents read this morning that the thing is not very enthusiastically considered by some of the local organizations. Perhaps the proper arrangement has not yet been suggested. It is to be hoped that further action will be taken, and that something will be done, either by the present committee or another one, to have some sort of branches of this Society all over the country, wherever they can be maintained.

Mr. Trautwine's idea of having lower grades in the Society, so that small and perhaps less important chapters can be formed than now, may possibly be a good one, although it is doubtful whether we should have such complication in our membership. With a proper "stirring up" from New York, and loyal interest among the members

Discussion on Local Associations (continued).

everywhere, we might, after a while, have a great many of these chapters, either large or small, all over the country. The electrical engineers are doing something in this line, with fair success, in various towns, but the speaker does not remember just how the co-organization is arranged. It certainly must be good for the papers and discussions of this great Society to be talked about in other places than headquarters, and among people who cannot get there very frequently.

George A. Ricker, M. Am. Soc. C. E.—Eleven years ago, I, with others, succeeded in bringing about an organization of local engineers in Buffalo under the name of the Engineering Society of Western New York. It was my hope that this organization should become a branch of the American Society of Civil Engineers, and it was a matter of keen disappointment to me and to my associates that no plan at that time was feasible for such a connection. Our local society has lived, and at times it has prospered; but has not a sufficiently high tone, it does not prescribe high enough standards for admission. It is too apt to be the policy of such local organizations to secure an extensive membership so that it may become successful financially, and unless it is successful financially of course it is doomed to failure finally.

I have not heard much about the establishment of local chapters of late years, and I did not know what the Board of Direction had done in the matter, but I believe that some plan should be and can be devised whereby local branches of the American Society may be established in certain localities where the members desire organization, and that it should be to the benefit of the local engineers and should reflect credit upon and be a benefit to the parent Society. I am earnestly in favor of such organization.

How it should be done, I don't know, but I hope that, as a result of the discussion at this meeting, and the deliberations that may follow, some feasible plan may be devised, and I am sure that most of my associates in Buffalo will agree with me.

The suggestion made by Mr. Trautwine, of increasing the grades of membership in the American Society, I should emphatically dissent from. I believe it would lower the tone of this Society, and would tend to withdraw from this organization some of the respect and support which it now has by reason of the high standards that have been established and the consistent raising of those standards that has taken place in the last few years.

I hope that we may be able to establish a chapter of the American Society in Buffalo. (Applause.)

George Y. Wisner, M. Am. Soc. C. E.—The matter of establishing local branches of the American Society was called to the attention of the Detroit members some time ago and referred to a com-

mittee. That committee has had occasion to meet once since arriving in Cleveland; some of the members have been absent in other parts of the country until recently, but it is the unanimous opinion, of all those with whom I have talked, that, as far as Detroit is concerned, a local branch is utterly impracticable.

A number of years ago, attempts were made to form an engineering society there. Three different attempts were made, and they failed; later, another organization was formed, the one which is at present in existence, which is a live society; but, I would say this, if its support were simply due to the members of the American Society who are residents of Detroit, it would be a failure. We have a society of about 160 members, and to form a local branch of the American Society in that city would be simply to bring the members into antagonism with the present society, and probably would ruin both.

I do not believe that the members of the American Society in that section of the country are in favor of such an organization. The American Society members there only constitute a very small part of the membership of the local society, and until the standing of the American Society is so changed that lower classes can be taken in, as has been suggested by Mr. Trautwine, I hardly see how it would be possible to organize such a chapter, and I doubt very much whether such lowering of the standard would be advisable. (Applause.)

B. R. Green, M. Am. Soc. C. E.—This movement, as it is called for the want of a better name, accidentally started in Washington, simply growing out of the information that came to the Secretary, Mr. Hunt, that the local members in Washington, having reached something like 70 or 80 in number, desired to organize a local branch or society of some kind. No society of civil engineers has ever been formed there.

Washington has grown, and the number of local members of this Society has increased from some 20, a dozen years ago, to about 80 now. Many mechanical, electrical and other engineers have also come there. More engineering work than ever before is now in progress in the city and its immediate neighborhood. A dozen years or more ago the few existing local members of our Society got together one night for a dinner and for mutual acquaintance. It proved so pleasant and useful to all that the dinner was repeated annually for several years. It was socially, and, to a degree, professionally, a success, in the making and renewing of each other's acquaintance and enabling us, members of a great and widely scattered Society, to become at least sufficiently acquainted to meet and talk with each other at any time. That is all we undertook to do, but it was unanimously agreed to as quite worth while.

Discussion on Local Associations (continued).

Recently, the local members, to the number of about 40, nearly all who were then in town, assembled to consider a revival of this matter, and see whether we might not establish a local organization, however elaborate or simple it might be. The object was not to read and discuss professional papers frequently, nor perhaps at all, for we did not suppose that a society on those lines mainly would be permanently successful, because it would depend too much upon a very few individuals who might have the faculty, disposition, and time to keep it alive. A committee was appointed to draw up a scheme for consideration. In going over the matter they happened to consult Mr. Hunt, the Secretary of the American Society, for some suggestions. The question at once arose as to whether the local organization should be confined to members of the general society. It appears that the Board of Direction took up the idea with much interest, resulting in the report and presentation of the subject that has been laid before us to-day.

To hear the report of our local committee, a very large number of our people were present and took active part in the discussion, which brought out and covered nearly all the points that have been discussed in the other localities as presented in the report from the Board.

Had any important local society of engineers of any kind existed in Washington, it is hardly likely that the members of the American Society of Civil Engineers there would have moved to organize themselves. The field was practically clear, however, and the question of a local chapter of the American Society, or an independent local society, therefore naturally arose. The discussion of our committee's report containing the suggestions of the Board of Direction, through Mr. Hunt, brought out so many important points and opposing opinions, all of which were extremely important and interesting, that the subject was postponed until next fall, when the committee is to call us together again for such discussion and determination that, with the light that may come to us in the meantime, we may arrive at some conclusion.

It clearly seems to me most excellent to organize local chapters of the American Society wherever the local members may desire to have one, and that they ought to do so under some general rule and the formal recognition of the Board of Direction of the general society. What each local society may thus undertake to do, whether little or much, or nothing, so long as they act within proper bounds as members of the general society, is of no consequence as to the general idea. If local conditions, such as the personnel of the local membership, the existence of other engineering societies, or any other considerations, be unfavorable to success or local harmony, the men interested can determine for themselves whether to organize a

local chapter or not, and the local society need not be more active than its members choose to make it.

As, however, our great American Society grows greater, and members become more and more numerous in all parts of the country and the world, it would seem extremely advantageous for local members who happen to become numerous enough to organize into chapters. There are many things for such local bodies to consider and discuss with profit to themselves and to the general society, even if it be nothing more than the politics of the Society; and if the general society is to continue to increase and grow stronger, I think it inevitable that before long, if not now, local organizations of its members will come into vogue. Questions of relationship to the headquarters and the semi-monthly meetings, etc., in New York, as to taking any part in discussions and the publications of papers will take care of themselves as the situation develops.

I think that the result of the discussion in Washington will be the formation of two engineering societies, one a chapter of the American Society, and confined strictly to its members, and the other a general engineering society, of which many of those men will be members, covering all fields of engineering and including, as many existing local societies now do, men interested in engineering work, though not strictly engineers themselves.

Membership in the American Society of Civil Engineers should be, above all things, a credential of standing as an engineer, personally as well as professionally, and subsidiary local organizations ought to be of great advantage to the members. I do not believe at all in Mr. Trautwine's suggestion that the American Society itself should so expand as to comprehend everybody who might desire to join it under one or another of the twenty or more classes that might be provided for that purpose. I think this Society already comprehensive enough for every kind of engineer competent for his age, from boy to man, because every man interested in engineering matters may now join the Society, if of proper personal character. Those who are not professionally engineers may become Associates.

I believe there is no motion before the meeting, only the report of the Board. If a motion is in order, I move that the plan for the organization of local chapters suggested by the Board of Direction be approved by this meeting.

H. S. Haines, M. Am. Soc. C. E.—I am a member of this Society, of many years' standing, nominally hailing from New York, though for some years I have been rather a cosmopolite; and it is from this standpoint that I would like to say a few words on this subject.

This proposition comes from the Board of Direction, who have

Discussion on Local Associations (continued).

given it careful consideration and have presented it to you in the form in which they think that it would be of most benefit to the Society. It is in that way that we, too, should consider it; how it affects the welfare of the Society as a whole, as well as how it affects each of us individually, and in that way our views will react on each other for the general benefit.

The American Society of Civil Engineers occupies a very different position from any local association of engineers; it is a body of selected members of the profession, selected, not only because of their technical qualifications, but also for their personal qualities. As a former member of the Board of Direction, I know that every name that comes before it to be canvassed is scrutinized as carefully with respect to the personal qualities of the candidate as with respect to his professional standing. Therefore it should be sufficient for us to believe that any one who wears a badge of membership in this Society is, for that reason, personally acceptable as a social acquaintance.

It is in that aspect that the proposition of the Board of Direction should be viewed. The Society, as it stands to-day, has its ramifications, not only throughout the United States, but also in many foreign countries, and, as our country becomes more closely associated with other lands, we may hope that it will be all the more to the benefit of the profession, and that our members will be more and more scattered over the face of the earth. As it is now, the heart of our Society is in New York City. As that heart pulsates, it sends out its currents wherever there are any of our members, though, necessarily, its impulses get weaker with distance unless they are reinforced in some way.

This seems to me to be the good purpose which is at the bottom of this movement; that the members of the Society scattered over the world may have some means of getting together in distant places and of knowing each other; not to read papers, but to sit down and smoke a pipe, and say "How do you do? Where do you come from? How long will you be here? Who do you know that I know?" and all that sort of thing. That is what is wanted. The membership of the local branches will change, as one man comes and another goes, but the center of meeting will remain and the feeling of good fellowship will be kept alive, and a man out in Korea or South Africa will be glad that he is a member of the American Society of Civil Engineers because it brings him in touch with other good fellows, strangers like himself in those distant lands.

Don't look at this idea as intended to rival the local associations in great cities like Chicago, Pittsburg and St. Louis. If I may be permitted to suggest an amendment to the proposition it is that any members of the Society, anywhere on earth, might form a chapter

of the American Society of Civil Engineers, and might fix their own rules and dues as they pleased, only let them notify our Secretary that at such or such a place there is a little nucleus of its members that is called a chapter. Then if I should be there, even if only for a week, I could go into the chapter and say "Here is my badge and yours; we belong to the same Society; we are brothers professionally and socially."

I was led to think of this because of the gentleman who just spoke to you from Detroit. My affairs have taken me to Detroit a good deal, yet I do not know one member of the society there. Why should I stay in Detroit for the most of three years and not know a single member of the society there? I don't want to meet my fellow-members particularly to discuss papers, but what I do want is to meet them socially. Let us try to look at the matter in that light and less with the idea of competing with local associations in reading papers. Can we not have it so fixed that five members can form a chapter by notifying our Secretary of their names, their officers and their address; have this information given in our publications, and if anybody goes to such a place he can find his fellow-members. In that way some real good may come out of this proposition of the Board of Direction.

F. L. Chase, M. Am. Soc. C. E.—The idea seems to be pretty generally agreed to that it is a good thing to have some connection between the local members and their associations and the main body, but it seems to me that the difficult thing is to get some working plan, and, from what I have heard this morning, I cannot see that any good working plan has been put forth. The idea that was offered of having a lower grade in the American Society would not, it seems to me, meet with general favor, and I have merely a suggestion for consideration looking toward some plan that will take advantage of the conditions that exist, that there are local organizations and that they contain a great many members of the American Society. The parallel of the Masonic Order has occurred to me, and it seems that something on that order might be perfected, in that a member of the American Society can be a member of the chapter without being a member of the main body of civil engineers; that is, a membership in the chapter would not carry with it a membership in the main body, and a man would be known as a member of such a chapter of the American Society, but he would not be admitted to membership in the American Society except in the usual manner. This would take advantage of the organizations that do exist, and any idea that will permit the influence of the American Society to spread seems to me to be an excellent thing in itself. Then these organizations would have the advantage of the literature, the same as the main body of the American Society,

Discussion on Local Associations (continued).

and whether they should be assessed, or any contributions should be made by these chapters to the main body, for covering the cost of printing, etc., is a matter to be considered later; but something along that line, it seems to me, would be worthy of consideration.

Mr. Oberlin Smith.—Tell us a little further how the Masons work the chapters.

Mr. Chase.—A membership in the lower orders does not carry with it a membership in the higher order, and, it seems to me, such a plan could be worked out here.

J. J. R. Croes, Past-President, Am. Soc. C. E.—Who is going to tell the difference?

Mr. Chase.—There would be certain restrictions imposed by the American Society; the Board of Direction would lay down certain regulations which the chapters would have to adopt. It seems to me that if such a plan could be put forth, it would be up to the local chapters to see whether they would adopt it, and as soon as a few of them have come in I think the idea might spread so that they would all want to come in and take advantage of any such arrangement as that.

Hunter McDonald, M. Am. Soc. C. E.—In 1889 the members of the American Society of Civil Engineers living in Nashville, Tenn., in response to a desire for closer social relations, met and organized what is now the Engineering Association of the South. We would at that time have become a chapter of the American Society of Civil Engineers had it been possible.

The organization was local at first, but has now spread over a considerable area of the Southern States. Recently, the constitution has been amended, so as to provide for local sections, the Nashville organization now being known as the Nashville Section. There is a prosperous Section at Birmingham, with good prospects for similar bodies at other points.

Unless the Board of Direction can hit upon some satisfactory plan of absorbing existing local organizations, it does not appear possible or desirable to form local chapters, which would of necessity antagonize them.

Willis Whited, Assoc. M. Am. Soc. C. E.—The point which I consider perhaps as vital as any in this matter is this: In Pittsburg there are about 122 local members of this Society. If they would all join a local chapter it might be a success, but there would have to be dues. If the dues were made $5 a year that would cut out a considerable percentage of them; if they were $10 a year it would cut out a larger percentage, and, as you all know, in order to make a success of a society of a technical nature the bulk of the hard work must be done by the younger men. The older men haven't time; the older men know more, but they know a great deal

that they are not at liberty to tell, and the younger men are the ones who cannot afford to pay the $10 or $15 a year as well as the older ones can, and some day, I think, that would be a serious difficulty.

The American Chemical Society has a local chapter in Pittsburg which is affiliated more or less closely with the chemical section of the local society; they apportion to each resident member of the National Society a certain amount, about one-third of the annual dues, to the formation of a local chapter, that, in that case, is sufficient to pay all expenses, so that they have a flourishing association, and it includes every local member of the National Society. Unless some such arrangement as that is made, I am very much afraid that it would conflict very seriously with the local associations in such a way as to hamper both the national and local societies.

As to the suggestion of having local associations, and having a difference in grade, admitting engineers as members in the local associations and not making them members of the National Society, that would have the very serious difficulty that it would give people who were not members of the National Society a chance to masquerade as members of such, which would do very much harm to both concerns. And that must be strongly guarded against. As to the National Society taking in the local societies, or members of them, under inferior grades, there would be difficulty in that because, for example, the society in Pittsburg includes some good leading members of the mechanical engineers who are not eligible to a high grade in this Society, and also the American Institute of Mining Engineers, and it includes a Past-President of the American Institute of Electrical Engineers. They would not be eligible in this Society as full members, and would probably hesitate a long time before they would consent to join in an inferior grade. They wouldn't feel quite as free to join the society as though they were active civil engineers.

Mr. Croes.—I had not intended to make any remarks at all on this subject, but, from some of the statements that have been made to-day, there appears to exist a great misapprehension in the minds of some recent members of the Society with reference to the aim and scope of the Society, and this requires immediate correction.

I am the oldest member of the Society now present, and one of the eight survivors of those who were admitted to the Society on its reorganization in 1867, and have followed its career all through, as some of you know, with great interest, and have taken a great deal of pains in bringing the Society to its present standard.

Any man who is an engineer, whether civil, mining, mechanical, electrical, or engaged in the application to the use of man of some of those powers of Nature, which have not yet been, but which will

Discussion on Local Associations (continued).

at some future day be developed into a science, is eligible as a member of the American Society of Civil Engineers in some grade. All that he needs, to become a member of the highest class in the American Society of Civil Engineers, is education, training and experience. Membership depends entirely on the individual character and professional character, as indicated by what a man has acquired, what he has learned, what he has done, and what he shows himself capable of doing. A man who does not know anything at all about hydraulics, who does not know the reason why or the manner in which water flows through a pipe, could become a member of the Society if he knew a sufficient amount about electricity or about mechanics, but he must have the foundation and principle of some of the sciences, have become accomplished in that branch of engineering to which he has devoted his attention, have acquired a good standing in the profession, and must have done something. It is the qualification of membership in the American Society of Civil Engineers that a man shall have had experience in and be capable of designing and constructing work in some class of engineering, that makes this Society different from and on a higher grade than any other engineering society in America.

The creation of different grades of membership is intended for the encouragement of the younger members of the profession, by bringing them into contact with men of experience and high professional standing, and inspiring them to emulate their example and follow the lines of progress which lead to the recognition of an engineer as a man worthy of confidence and respect. Full membership in the Society stands for something done, something accomplished, the ability to accomplish which is proven not by education merely and not by experience alone, but by education supplemented by experience. The Junior of the Society is admitted because he has studied under competent teachers the principles of some branch of engineering and intends to devote himself to that as a profession. An Associate Member becomes one after he has proven himself capable of constructing and managing work to a certain extent. A Member becomes one when he has had an experience which shows that he is a man of worth and of value and is qualified by a varied experience to design as well as to construct.

The turning of this Society into a training school, an elementary school, in which are numerous classes to be instructed, and making as many grades of membership as there are degrees of proficiency in the several classes, as one of those who has spoken here to-day seems to think desirable, is not the idea of the American Society of Civil Engineers at all. It is not a training school, it is a school of conference, a school of men every one of whom has demonstrated his ability to advise his associates on points on which he has had

experience, and is ready with his associates to discuss the points of difference between their conclusions. Membership in the American Society of Civil Engineers gives an engineer a certain prestige, as being a man who has accomplished something creditable. To the member himself it gives a certain satisfaction in the feeling that he is worthy of being classed among men who have accomplished something. There are three grades of membership, representing respectively a certain proficiency in character and book knowledge, practical experience added to such knowledge, and the ability to apply intelligently the combination of knowledge and experience which fits him to solve any problems that may arise in his line of work.

That there should be associations of members of the Society in any locality where there is a large number of members is very desirable indeed, and some means should be provided them for social and professional intercourse, instead of their being obliged to come to New York to discuss a paper or to talk with their fellows and equals about public works and about the management of them. If they could get together frequently and have informal discussions, it would doubtless be of great benefit to all concerned, for it is not uncommon for us to learn a great deal more in an hour of oral discussion than from the perusal of written or printed matter which has not been subjected to free criticism.

The members at New York, where the Society's headquarters are and the business meetings are held, have a great advantage over those living in distant parts of the country, and it is very desirable that members in San Francisco or Kansas City or Detroit, or anywhere else should have some means of meeting each other for social and professional intercourse. The difficulty is that the maintenance of such an association involves an expenditure. The greater portion of the expenditure for the main meetings of the Society is borne by the resident members within fifty miles of New York, those outside paying smaller dues. If these latter wish to enjoy the privilege of personal association they would necessarily and properly be called upon to pay additional dues for the maintenance of their local association. To some it has seemed desirable to allow persons not members of the Society to join such local associations and thus reduce individual cost. The proposition issued by the Board of Direction as a possible method of affording means for members coming together does not contemplate the taking into the Society, or into any local association of the same, members of other organizations. The trouble is that in such an association no distinction could be made among the members, and in the public estimation persons thus admitted to a quasi membership in the Society, but who were not qualified or had not taken the pains to become members of the

Discussion on Local Associations (continued).

American Society of Civil Engineers, would stand on the same ground as members of the Society. These local members would pay their dues and get all the benefits of the Society, would associate with the members of the American Society of Civil Engineers and have access to their publications, but they either do not care enough to pay $15 more a year to become members of the American Society of Civil Engineers, or they may not be qualified for such membership.

There are men holding very high positions who do not take enough interest in the general work of the advancement of engineering science and the placing of the profession on a high plane, to become members of the American Society of Civil Engineers. They are professional men of high grade and hold high positions as engineers of specific branches of engineering and are eligible to come into the Society if they so choose, but if they do not choose to come in, they ought not to be admitted to the privileges enjoyed by the members of the Society, without fulfilling all the requisites for such membership and contributing their proper share to the cost of maintenance of the Society.

M. R. Sherrerd, M. Am. Soc. C. E.—I would like to second the motion of Mr. Green. I don't think it was quite well understood by the membership of the Society that, as the matter is left by the Board of Direction, it would leave it optional with the local members of the American Society to adopt this plan. It seems to me that meets with most of the discussion of this morning. This report or suggestion of the Board of Direction would leave it optional with any local collection of members to adopt that plan. There seems to be a desire on the part of some communities to do that, and, as I understand it, the matter is left in that shape. I will second Mr. Green's motion.

The President.—Any further discussion? Do you wish to have Mr. Green's motion read?

Mr. Croes.—There was nothing obligatory about it. Such associations can be formed in a manner outlined by the Board of Direction, provided they are confined to members of this Society.

Mr. Green.—I made the motion, which seemed to be quite in order, under the impression that the Board of Direction desired action upon its suggestion. It may be that the Board already has the necessary authority to organize chapters. At all events, a vote of approval of the suggestion and recommendation of the Board would be quite proper.

Mr. Croes.—I move that it is the sense of this convention that the regulations for the formation of organizations of local branches of the American Society of Civil Engineers, as set forth by the Board of Direction, be approved.

Mr. Green.—To get the matter clearly before the meeting, I would ask if we are to understand that the Board is simply presenting the subject for our information? What is the nature of the matter presented to us by the Board?

Mr. Oberlin Smith.—As the next act on the programme commences in the next three-quarters of an hour, and there is hardly time for luncheon, I move that we adjourn and take this up at the next meeting.

The President.—Before we adjourn the Assistant Secretary has some announcements to make. Is it the desire of this meeting to postpone the announcements until to-morrow? They are very important, and affect our meeting.

Mr. Oberlin Smith.—My motion was to continue the discussion of this matter at the next session, as it is so late now we have hardly time for lunch.

Announcements.

The Assistant Secretary.—On the programme as printed there is a mistake. It reads: "Wednesday, June 21st, 10 A. M., assembly-room, Case School of Applied Science"; that should be: "in the assembly-room of the Hollenden Hotel, the Society will be addressed by several gentlemen, etc."

Another announcement is in reference to the invitations and cards for the reception on Friday evening; they may be obtained at the Secretary's office this afternoon or this evening.

I am requested to announce the following:

"This is to ask that you announce to your members that the Bell Telephone Company tenders free long-distance service to all members of the Society between the hours of 6 P. M. and 9 A. M., every day of the convention. Engagements to talk during these hours may be made at any time. The company would be complimented by a liberal acceptance of this offer."

Motion to adjourn seconded, put and carried.

Adjourned.

Second Session.

Second Session.—The second session was called to order Tuesday evening at 8.30 o'clock by President Schneider, at the Hollenden Hotel.

The Assistant Secretary.—I have just received this announcement:

Announcements

"A handicap golf tournament will be held at the Euclid Club on Thursday at 3 o'clock in the afternoon. All desiring to enter will please hand in, at the Secretary's office, their names, the length of their home course and their average score. Further information may be had from Mr. Polk or Mr. Gartensteig."

A meeting of the Special Committee on Concrete and Reinforced Concrete is called for Wednesday, 10 A. M., in Parlor K.

Announcements.

A meeting of the Board of Direction will be held in Parlor O immediately after the adjournment of this meeting.

The President then presented his Annual Address.

Adjourned.

Third Session.

Third Session.—The third session of the Society was called to order on Wednesday morning, June 21st, at 10 o'clock, President Schneider in the chair; Assistant Secretary McMinn acting as Secretary.

The President.—The Society will be addressed by several gentlemen on points of interest in Cleveland. In the afternoon visits will be made to the various industrial establishments described this morning. Those desiring to visit the plants which will be described are requested to be at headquarters at 1:30 p. m.

Mr. Mordecai, Chairman of the Local Committee, will please take the chair and introduce the speakers.

Mr. Mordecai took the chair.

Announcements

Mr. Mordecai.—I would like to make a few announcements. First, there will be some special cars in front of the hotel at exactly 2 o'clock this afternoon to take the ladies to the White City. These cars have been very kindly furnished by the Electric Railway Company, and admission to the White City has been granted to all who are attending the convention, both ladies and gentlemen.

I have an invitation from The Sherwin-Williams Company, for those who desire to visit their plant. They say:

"Please assure them that we would be only too glad to extend any courtesy. We would like to know if it is not possible to arrange some definite hour at which we might expect them, in order that we can have guides on hand, and be properly prepared to show them through the plant."

Any one wishing to visit the paint plant of The Sherwin-Williams Company will please notify the Secretary.

I also have a letter which explains itself:

"Cleveland, O., June 21, 1905.

"Mr. A. Mordecai, *Chairman, Local Committee.*
"American Society of Civil Engineers,
"The Hollenden, City.

"Dear Sir: For the benefit of the members of your Association and their friends, we will place in service to-morrow (Thursday) morning, a new yellow automobile touring car for seeing Cleveland, starting from The Hollenden at 9 and 11 a. m., and 2 and 4 p. m., making trips about the city, and covering locations and points of interest suitable to the parties. This auto will be in charge of an expert chauffeur and guard. We can carry twelve to fourteen each trip; fare 50 cents each.

"If you will kindly have this read in your meeting, as promised, you will greatly oblige,

"Yours truly,
"C. R. HUNT,
"Cleveland Sight Seeing Company."

The Secretary now has some announcements to make.

THE ASSISTANT SECRETARY.—The City Passenger and Ticket Agent of the Erie Road has requested me to announce that it will expedite matters and help him very much if members will notify him as to when they expect to leave, that is, if they will secure their berths, reservations, etc., at as early a date as possible, as he fears that there may not be a sufficient number of cars on hand to accommodate a large party starting at the same hour on a certain day.

The Cleveland Electric Railway Company is welding track with thermite. Arrangements can be made to see the process by calling up telephone Main 28, Bell telephone, or Central 1350, Cuyahoga 'phone, on Thursday morning. Ask for Mr. Clark, who will state where the work is being done. It is in progress, by the way, at a number of different points, and the company will be very glad to have it inspected. Many of our members have seen this process before, but some, possibly, may not, and would like to see it.

MR. MORDECAI.—Yesterday we showed you beautiful Cleveland, and now we propose to show you industrial Cleveland, and to tell you about what you will see. The Local Committee thought it would be well to ask some of the gentlemen to make a few remarks upon Cleveland and the industries that you will visit this afternoon. I will call upon Major Dan C. Kingman, United States Engineer, to tell you what Cleveland is geographically. I have great pleasure in introducing to you Major Kingman.

MAJOR KINGMAN.—Mr. Chairman, Ladies and Gentlemen: I hardly know what is expected of me at this particular time. I was only spoken to about an hour ago, and, while I think I know a great deal about the harbor of Cleveland, I am afraid if I started in to talk about it I should say too much. Whatever now makes the greatness of Cleveland it was because it was started originally as a lake port; there was a practical harbor at this place. In 1825 it consisted of a small settlement at the mouth of the Cuyahoga River, and its commerce was carried in perhaps 75 little vessels that arrived and departed during the year. It is now a great city, seventh in the United States, with a population approaching half a million, and its business is now carried on by immense steel ships rivaling the size of those upon the ocean. Address by Maj. Kingman.

The receipts and ships in tons amount to more than ten millions per annum. I am sorry I haven't a large map of the Great Lakes

Address by Maj. Kingman (continued).

available so that you can follow me in what I say. I hope, however, that the shape of the Lakes is sufficiently familiar so that you can see the point I want to make. Nature has clearly fixed and established four points upon the Great Lakes where large commercial harbors must exist and where great cities must grow up. These four points, of themselves, could suffice for the through business of the Lakes. There are many other harbors, of course, and they are of value locally and to a certain extent to the general commerce, but their position is more or less accidental, and is not as clearly indicated geographically as in the case of the four which form the great quadrilateral. These four are Duluth, Chicago, Cleveland and Buffalo. Duluth is situated at the western extremity of the system, as far in the interior as it is possible for a ship to go. It serves the needs of the Great Northwest, a region abounding in raw material, wheat, lumber and ore, and a region requiring the manufactured products of the East. By a system of land routes, it gathers up this raw material for shipment and sends it to the manufacturing centers of the East. It receives in return coal and manufactured products, and distributes them by rail throughout the Northwest.

Chicago, at the southern end of Lake Michigan, serves a like purpose for the Southwest. The great corn region of Illinois, Iowa, Missouri, Nebraska and Kansas is naturally tributary to Chicago, and receives from Chicago the commodities of the East.

Cleveland, the most southeasterly point of Lake Erie, serves in like manner the needs of the Southeast. It is the natural point for receiving the iron ore from the West and distributing it to the furnaces of Western Pennsylvania, Ohio and West Virginia, and for receiving and forwarding the coal and manufactured articles of this same territory.

Buffalo is the fourth city of the "Big Four." It is situated at the eastern end of Lake Erie, as far to the eastward as a large ship can go. It is the place that receives all the products from the West destined for the sea coast, and is the lake point most easily reached from the ocean. Buffalo derives its importance as a lake point from the accident of Niagara Falls. If this great obstacle did not exist, and vessels were free to pursue their course to Lake Ontario, the fourth great port would undoubtedly be situated at Oswego, at the mouth of Oswego River. This point would be more than 100 miles nearer to New York and Boston, and, in my judgment, the present commerce of the Lakes would be benefited by at least $3 000 000 a year if Oswego could be made the eastern terminus. Nobody knows this any better than the people of Buffalo; and they do not desire that an adequate ship canal shall ever be built on American territory around the Falls of Niagara.

To come now to the harbor of Cleveland, I do not know when the first vessel entered this port. The attention of the General Government was first called to it in 1825, when an appropriation of $5 000 was made to build a pier at the mouth of the Cuyahoga River. At this time the river emptied into the lake to the westward of the present jetties. A long, low, sand bar ran out from the eastern shore across the present entrance, and the depth of water at the river mouth was only 3 or 4 ft., but, after crossing the bar, there was a depth of 15 ft. in the river. Prior to 1825 the local authorities had attempted some improvement, but the work was primitive in construction and design, and did not produce the desired results.

A harbor is something more than a shelter or a place for vessels to lie in; it means a place where the mode of transportation is changed from land to water or from water to land, and, in order to be successful in this, it is just as important that the land approaches should be considered and just as important that the train should come along to the ship. A harbor that does not afford adequate approaches for trains is no better than a harbor that has insufficient depth of water. Cleveland has plenty of water, but its land approaches are not altogether what they should be.

In 1874 the total amount of business done in the ten harbors in the State of Ohio was about $4 500 000; in 1902, $31 500 000. The harbors of Toledo and Sandusky, with the adjacent small harbors of Port Clinton, Huron and Vermilion, serve certain portions of the country not naturally and directly tributary to Cleveland. They are both at the mouths of rivers, and there are natural land routes up the valleys of the same. These harbors would have their own commerce and would grow if the harbor of Cleveland did not exist at all. But the five harbors to the eastward, namely, Lorain, Cleveland, Fairport, Ashtabula and Conneaut, all serve the same territory, that is, the Pittsburg region.

The United States is helping Cleveland to extend the breakwater, which will carry it about 3 miles to the eastward, and it will then afford a sheltered basin of nearly 5 miles along the lake front, and yet, up to the present time, not one-tenth of that has been utilized. The commercial harbor is within the river, narrow, crooked, and difficult to reach, so that a trip up it is more dangerous than a trip across the lake. The time will come when Cleveland will adopt modern methods of treating its harbor—like New York, Philadelphia and the sea ports of Europe—and own and control the approaches to its wharves and the machinery and appliances used in the handling of freight.

When this is done, Cleveland will be able to control absolutely the iron ore and coal commerce on Lake Erie, and will attain a growth and development in comparison with which all that has gone before will be as nothing. (Applause.)

Mr. Mordecai.—To give you a little better idea of the details of the city I will call upon Mr. W. J. Carter, City Engineer of Cleveland, and a Member of this Society.

Address by Mr. Carter.

W. J. Carter, M. Am. Soc. C. E.—Ladies and Gentlemen: The City of Cleveland covers an area of 35 sq. miles, and is about equally divided by the Cuyahoga River into two parts, which we call our "East Side" and "West Side." The level of the lake at this point is about 575 ft. above sea level. Our water supply comes from the lake, and is brought in through a 9-ft. tunnel, the intake being at a point 4½ miles from the shore. At the shore end, our Kirtland Street pumping station—the new station which has been in service about a year—has a capacity of 100 000 000 gal. per day. The water is pumped from this station through about 400 miles of mains. We have two reservoirs in connection with this, of which the Fairmount, or low-service reservoir, contains 80 000 000 gal., and the Kinsman, or high-service reservoir, contains about 35 000 000 gal.

In order to take care of the water there are about 400 miles of sewers, and they vary from 16 ft. in diameter to the small pipe sewers.

We have under construction at the present time a large part of the intercepting system of sewers, 13 ft. 6 in. in diameter. Some of this is being built in open cut, and some in tunnel by means of a shield. Either of these points is very easy of access, and can be visited by any of the members who desire to see the work in progress.

We have about 600 miles of streets, but of this only 254 miles are covered with pavement. This pavement is divided as follows: Medina block, about 91 miles; asphalt, 18 miles; brick, 143 miles; wood block, only 2 miles, this wood block being principally on bridges. The brick pavement we use is known as the 5-in. block. I believe we hold the very unique position of being the only city using a 5-in. paving brick. This brick is manufactured within a radius of 60 miles of the city. A great deal of this paving is laid upon a sand foundation, without concrete.

We have 1 500 acres of parks, a description of which is given in the pamphlet; practically all these parks are on the "East Side"; on the "West Side" they are not as extensive. On the "East Side" we have Gordon, Wade and Rockefeller Parks, which were gifts to the city by Mr. Gordon, Mr. Wade and Mr. Rockefeller; the "West Side" parks have been principally purchases. There is at the present time a proposition to connect these parkways with a grand boulevard entirely circling the city; some parts of that have been built; the portion you saw yesterday was a part of that scheme.

One of the earliest bridges built here was the Superior Street Viaduct, started in 1874 and completed in 1878. This viaduct is

3 211 ft. long, and consists of stone arches and iron bridgework; it cost about $2 250 000. The Central Viaduct, built in 1886 and 1888, has a length of 2 838 ft. There is a great deal of delay to traffic, not only on the river, but on the streets, by reason of these bridges not being of sufficient elevation above the river. The subject is being agitated very strongly at the present time, and we will probably have a high-level bridge in a few years.

The Columbus Street Bridge is one of the unique bridges of the country, being a double swing bridge. Middle Seneca Street Bridge is a double Scherzer. The bridge at Columbus Street is now under construction, but not far enough advanced to give an idea as to its character, the concrete work is under way, but no metal work has yet been delivered.

On our grade-crossing work we are making good headway. There is a very interesting piece of work under way at Willson Avenue and the Erie Railroad tracks; another piece of work is under way at Detroit Street; one at the Lake Shore, and one at the Nickel Plate. We have plans laid out for grading the entire Pennsylvania System.

Our river frontage is about 16 miles. There is another structure in the city that probably some of the members would like to see; that is the rolling roadway, built by a private corporation, operated under a franchise and in daily use. (Applause.)

Mr. Mordecai.—Among the plants of which we are proud there is one that is known, I might say, all over the world, and which we will visit this afternoon, the plant of The Brown Hoisting Machinery Company, and I will ask Mr. Alexander Brown to tell us what we will see there.

Address by Mr. Brown.

Mr. Brown.—Ladies and Gentlemen: Mr. Mordecai simply asked me to say what you might see this afternoon at the works of The Brown Hoisting Machinery Company, but I think that is rather a dry subject unless I explain the cause of its existence, the reason for it, how it happened, what it has accomplished, and what we hope to accomplish in the future. The reason of its design may be questioned unless that is known.

The last meeting of this Society in Cleveland, which I attended, was in 1879, and in 1880 was started the business of which our present plant is the continuation. The reason of its existence was very well explained by Major Kingman—the increase in the commerce of the Lakes. In order to give a clear idea, or rather a graphic idea, of what very few people realize, I will state that the almost marvelous increase of business in twenty-five years that has occurred all over the country is due almost solely to the product of the Lakes.

We are so apt to think things occur generally that we attribute

Address by Mr. Brown (continued).

them to circumstances as they go along from day to day without ever considering that there are definite positive causes, generally local, which produce that general result. In 1883 there was received at all lake ports about 1 000 000 tons of ore; in the five years after that, 16 000 000 tons; in the five years following, 38 000 000 tons; in the next five years, 46 000 000 tons; in the five years following, 100 000 000 tons of salable ore; in the last two years, 46 000 000 tons. In the past five years, including this year, there have been 150 000 000 tons of iron ore taken out of the ground, transported an average of more than 1 000 miles and delivered at the different ports, thence taken by railroad and delivered to the furnaces, handled again and put through the furnaces, and finally turned into the steel that you, gentlemen, are all using; taking, probably, in the last twenty-five years more than 250 000 000 tons of iron ore, representing about 180 000 000 tons of iron and steel, from this one region.

In 1880 I happened to be personally connected with the people who had to do with the first discovery of the mines in Lake Superior, that is, in the operation of them afterward, and I can remember, although it doesn't seem long ago, when the 900-ton vessel on the Lakes was about the largest. In the year or so afterward, 1 200-ton vessels were built, and were considered to be almost beyond a good workable value; in a year or two after, an experimental boat was made, called *The Onoko,* of 2 000 tons, the first iron boat on the Lakes; to-day there are a number of boats of more than 10 000 tons capacity and several of 13 000 tons capacity, having a draft of water not exceeding 18½ ft. If, on the ocean, their displacement would be something like 30 000 to 36 000 tons, if they were made with proportional depth. All this has occurred in the twenty-five years since this Society was first here.

In 1880 it was seen that it was impossible to develop the mines and get the ore to the furnaces, unless more adequate means were provided to handle it at the terminal places from which the railroads took the ore. At that time a horse with a half barrel attached to a rope passing over a sling on the vessel to a half barrel on the other end of the same, with planking over the hatchway, and a wheel-barrow, formed the sole hoisting apparatus in use; shortly after that occurred the substitution of the donkey engine for the horse. That was displacing the rights of the drivers, and trouble occurred.

In 1880 the business arrived at that point where something had to be done, or else the development of the ore industry and steel works in the steel district would be checked and hampered, because they had reached the limit in the handling of lake ores; eastern ores were to some extent imported, and native State ores were used to some extent to make up the deficiency. At that time attention was

called to the handling machinery here, particularly at Cleveland. On the New York, Pennsylvania and Ohio docks the first apparatus was put in. The first machine was a cableway. The necessity of keeping the ore space clear was recognized, and the cableway spanned over the tracks, about 380 ft. deep. Upon the introduction of this first automatic machine there was a labor fight against it for a year, until it was demonstrated that labor could make three or four times as much per day and live longer, as many of the men lost much time and strained and broke their backs in carrying planks to prepare for the wheel-barrows in the old way. After that was demonstrated, it was a difficult thing to keep them away from our office, wishing to contract for the next season's work.

The first boat that was unloaded with it had formerly used the wheel-barrow. The men were divided into 10-hour shifts and were paid $6 apiece, or at the same rate per ton as they had received when using wheel-barrows, with which old method they only earned about $2.50 per day. The allowed demurrage for unloading was four or five days; now it is not more than that many hours, and there is practically no demurrage.

To give an idea of what 280 000 000 tons of ore means, I will say that it represents a pile 30 ft. high, 200 ft. wide and 100 miles long; in other words, it represents about twice the excavation for the present Panama Canal. The salable ore taken out in the last five years has caused an excavation equivalent to that for a ditch about equal to the Panama Canal, and yet they are still hunting for apparatus to dig the Panama Canal in ten years, while some of it is already excavated.

You can see from this outline that there was a necessity and a reason for producing machinery and appliances for the rapid handling of material, both in delivering it to the boats and taking it from them, in order to keep up with the rapid development of the ore business as well as the steel industry. The railroad companies had to keep pace with it; the vessel interests had to keep pace with it, and the result has been, as I have said, a growth practically from no business to more than six or eight times the greatest traffic of the kind in the world, that is, more than all the nations put together, in the same time, for that commodity.

In 1880 we had no works, just simply the first plant, and from that time it has been a constant and hard, heavy grind in the harness to keep up with the pace, and it has been impossible to do this. As fast as one improvement is made in the terminal facilities the vessel interests match it, the discovery of ore over-rides it, and more machinery has to be applied to keep up with it all; the steel industry has gone at the same pace until now they have got in almost one organized body to try to beat the other end, that is the mining,

Address by Mr. Brown (continued).

but we hope to be able to keep up with the handling end, and the works that you will see this afternoon grew from nothing to what they are at present. Just from the force of necessity of these local conditions—I say local with respect to the country at large—but this very local industry has had more to do with the prosperity, the standing among the nations, and the growth of this country than all other causes combined.

The ocean traffic is as it was two hundred years ago. Terminal facilities, with few exceptions, are no better; they simply use more men, more stupidity, more muscle and larger boats. With a dozen exceptions, probably two hundred years ago they could unload a boat equally well at any of the best coast harbors in this country or Europe. New York harbor is a disgrace, Boston harbor is a disgrace, all the harbors on the coast of this country are a disgrace, when we all know the energy, the good business ability and the quick judgment of business men to take hold of projects that will produce good returns in carrying them to completion; but simply the habit of the eastern coast has kept them where they are, they have almost gotten the Far East lethargy and believe their method good enough; the conditions have always been there and there they must remain. However, at present there is a decided uneasiness and a decided trend toward the betterment of the coast, as the Lakes have been bettered, and when that is done it will be very difficult to determine what progress we will see in this country twenty-five years from now.

The ship building on the Lakes exceeds all other ship building of the entire United States. That will give some idea of how far behind the East is in that particular means of progress in this country.

The works that we have now are the outgrowth of necessity, and in 1900 we had to reorganize in order to see what to do to double the capacity of our works. After fairly getting started we had a disastrous fire that wiped out our entire place in the midst of the busiest year we ever had, and that necessitated carrying on the business, building, and doing all the work at the same time, with as little injury to our business as possible, and that, like other times in our business, forced us to do things which, if we had had all the time in the world, we would probably not have done half as well. It forced us to find, in the same area, capacity to double or treble our former business, of which we supposed we had reached the limit. I am glad to say we have trebled the capacity on the same area we had before, but, as I said, this very necessity forced us to do things—as generally the best work is done that way—that we would not have done if we had had all the time and opportunity at our disposal first to consult and afterward to go ahead. The result of the fire was that we were greatly afraid of being burned out again, not but what we could

get insurance, perhaps, but the loss and interruption to business was more than a person could stand twice in a lifetime. Our determination was that our shops should be made absolutely fire-proof, and the difficulty of doing that within reasonable cost and at the same time covering the area, together with the necessity of doing it along with other business, took a great deal of what you will be interested in, that is, the engineering end of the problem.

At present the main building consists of one large room. We abandoned the idea of trying to stretch out in one long building, commencing work at one end and finishing at the other. That method, I am satisfied, is obsolete for most places; a building is wanted only as a cover and a place to support overhead cranes, the closer you can get to your management in a building the better. If it were made in one long stretch it would be more than 3 000 ft. long, taking all the buildings. Our main building would be 2 500 ft. long and 71 ft. wide. Imagine the supervision required in having to start from one end and walk half a mile to give an order. At present it is 500 ft. front by 312 ft. deep, and is under one roof. The foreman is rarely more than 250 ft. from anyone he wishes to talk with, for his central office is not more than 300 ft. from the farthest point of the building. This compact method lends itself to the machine shop, the structural shop and to the assembling between the two, in such a way that all the materials go the least possible distance, with the least possible handling and supervision, to their final loading on the cars. This construction also leaves the building without partitions and without obstructions, free for future changes which we cannot anticipate—which is so much appreciated in this country—it isn't added to and taken from every time you wish to do a new piece of work. It is left a simple open area with a cover, that is the structure of our building.

The fire-proof feature is this: The whole building, to start with, is of steel, that is, the framework, the foundation is all of concrete, the sides and roof of concrete and steel. I was confronted, however, with one thing, that there was no roof covering made at the time, that was entirely fire-proof, but what weighed from 35 to 40 lb. per sq. ft., also including a system of purlins and sub-rafters which were a necessity to hold the blocks of tile, etc. This necessitated a larger amount of structural material than we were willing to put in for this purpose, as it is only a cover to keep out rain, wind and snow. I made up my mind that it was not good sense to load the building down with from 35 to 40 lb. per sq. ft., besides providing for 30 lb. for snow and wind, and told our engineers to design for 15 lb. per sq. ft., and we would not exceed that for the roof covering. I found it impossible to get anything fire-proof anywhere near this weight per square foot, and that forced me into

Address by Mr. Brown (continued).

finding, or designing, or doing something for this purpose while the building was going on, and, until the building structure was nearly up, no one knew what we were going to put on either the sides or roof. The theoretical thing in my mind was to make some thin metal that would hold a thin body of cement, not to exceed 15 lb. per sq. ft., that would be water-proof and fire-proof, and capable of spanning about 5 ft. from purlin to purlin. It occurred to me to make dove-tailed corrugations of sheet metal. The commercial end of making that was the difficult proposition, but I happened to strike on a method of accomplishing it which I will show you this afternoon. This material can be made so cheap, commercially, that it is now included as one of the branches of our business. To give you an idea of how little cement and steel it takes to make this roof covering I will say that it is composed of No. 24 dove-tailed sheet-metal (or ferro-inclave, as we call it) with corrugations only $\frac{1}{2}$ in. deep, covered on the top and above the corrugations with a thickness of $\frac{3}{8}$ in. of mortar, 1 part of Portland cement and 2 parts of sand, and the under side plastered with adamant or cement plaster of the same thickness as the top coating, making the thickness over all about $1\frac{1}{4}$ in., and the whole weighing only from 14 to 15 lb. per sq. ft. This covering will stand about 5 ft. with a working load of 60 lb. per sq. ft., with a factor of safety of 5; in other words, when tested with 300 lb. per sq. ft. the plaster on the under side will just crack; the same material, ferro-inclave, is not only used for the roof covering, but also for the sides, gutters and ornamental work, fittings, cornices, etc. This construction, where only 15 lb. per sq. ft. for the roof covering had to be provided for, saved us more than $50 000. That is, this additional sum would have been required for the structural work of the building, in excess of what was actually used, if any of the other forms of fire-proof roofs had been adopted.

This main building is allotted for machine, structural, forge and assembling spaces, and they are so related that the work from each is transferred to the final assembling floor with the least possible handling. Our pattern shop and pattern storage vaults, and template shop and shipping space are in the lot east of the main building and connected thereto by two railway tracks. The power-house for the whole plant is in the lot north of the main building, and there also are the carpenter and ferro-inclave shops, together with the storage space for raw material.

I will be glad to show you this afternoon the condition at our power-house from which we would like our city to take example, that is, you will see no trace of smoke coming from the stacks of our boilers, and, as a matter of fact, no smoke is ever seen coming from them, from morning to night. I will be happy, indeed, to show you through all our works.

Mr. Mordecai.—The next plant that we will visit will be that of The King Bridge Company, and I will ask Mr. Harry Fuller, a Member of this Society, to say what we will see there.

Address by Mr. Fuller.

Harry Fuller, M. Am. Soc. C. E.—Ladies and Gentlemen: I have been asked to tell you some of the interesting things you may see this afternoon when you visit our plant. I am going to take some liberty with that request, and not tell you, because I am afraid if I told you all about it, it is a warm day and you wouldn't come. We want you all to come. The plant in general is pretty much the same as all large bridge shops the country over. We cover an area of about 20 acres, have an annual capacity of from 25 000 to 30 000 tons, depending upon the nature of the work, and I take it that you as engineers are more particularly interested in the finished product and class of work than in the exact method of doing it. I believe that each member can form his own opinion as to what is interesting to him better than I could tell you, and I simply want to extend a very cordial invitation to you to visit our plant this afternoon. I thank you.

Mr. Mordecai.—The next place we will visit will be, not a manufacturing plant, but the Case School of Applied Science, which is an institution very well known all over the country, and I will ask Professor Howe, of Case School, to tell us what we will see there.

Address by Prof. Howe.

Professor Howe.—Mr. President, Members of the American Society of Civil Engineers, Ladies and Gentlemen: The northeastern part of Ohio is called the Western Reserve. This was settled by people from Connecticut, and, naturally, they brought with them their ideas regarding education. With such an ancestry, Cleveland has always had schools which would compare favorably with any in the United States. Its common schools are good and its high schools are good. I believe there are, at the present time, five large high schools in this city, having a membership of more than 4 000 pupils, giving, if I am not mistaken, a larger percentage of high school pupils than is found in any other city of the country.

One of the modern features of common school education is manual training; formerly it was considered enough to educate a boy's brains, now it is considered necessary to educate his hands and his eyes, and so manual training has been introduced into the high schools and, to a certain extent, into the common schools of the country. Cleveland has kept pace with this movement, and, at the present time, there are manual training departments in each of the high schools of the city. If this Society had time, I am sure the school authorities of Cleveland would gladly welcome you into any or all of these high schools in order that you might inspect the work. There are also a number of private schools in the city, and a number of colleges and universities. Two of these, Western Re-

Address by Prof. Howe (continued).

serve University and Case School of Applied Science, are situated side by side on Euclid Avenue in the eastern part of the city. I believe it is arranged that you will visit Case School of Applied Science this afternoon. Many of you are technical graduates, some of you are professors in technical schools, and I have no doubt all of you have visited technical institutions. I do not wish, therefore, to say very much about the equipment of a technical school, because you already know about what you will see in an institution of this kind.

I will, however, mention one or two points which may be of interest to you, and which we will try to show you this afternoon. Case School has, of course, in common with all technical schools, different departments, departments of civil engineering, mechanical engineering, electrical engineering, mining engineering and chemical engineering. Each of these departments has a building to itself, except the department of civil engineering, which occupies a part of the main building of the institution.

The apparatus in civil engineering is interesting to a certain extent, but it is not, perhaps, as interesting as the apparatus in some other departments; but you would, of course, be naturally interested in what there is to be found in a department of this kind. One of the things we will show you is a very precise level which was built to our order by a local firm. The interesting point to us in regard to it is that it is made of nickel-steel, which was carefully made according to formulas given by our professors, and carefully tested before made. By means of this nickel-steel the coefficient of expansion of this level is reduced to about one-third of what it would be in an ordinary instrument. It is a question whether it would not be advisable to use nickel-steel in all engineering instruments, in order to reduce the expansion of the instrument to the smallest ratio. In our testing department we have a large, transverse, beam-testing machine which will break a steel beam 20 ft. long and 18 in. deep. So far, we have only tested 15-ft. beams.

We are erecting at the present time two new laboratories, and, instead of testing sample pieces of steel, we have taken a beam from each building and tested that. The first beam tested was one of 15 ft. 11 in. span, 12 in. high and supposed to weight 31½ lb. per ft. The interesting part to us was that this beam fell short 5% in weight, and, instead of having a factor of safety of 4, which is stated in the handbook as the proper factor of safety, we actually found a factor of safety of 2.8. It is a question whether the I beams used in our buildings, instead of having the factor of safety stated in the handbooks, as engineers suppose, have a factor of safety of only 2.8. It would be interesting to those who are putting up buildings, in which steel beams are used, to have sample beams

tested in each case, and thus determine whether they are getting as strong beams as they suppose when they purchase them.

Practical astronomy is taught to every civil engineer who has a broad education. He must know something of geodesy. We have a small observatory, specially fitted up. One of the most interesting features in this observatory is a very fine clock, which we will show you to-day. It is a Riefler clock, enclosed in a glass case from which the air has been exhausted, so that the movement is in a partial vacuum. It is wound by electricity once in each period of from 4 to 8 minutes. This clock has the best record of any clock for which records have ever been published, and we feel quite proud of it. I may say that, for a period of from 2 to 3 months, the average daily deviation from the mean daily rate is $\frac{15}{1000}$ of a second, and the greatest deviation has been $\frac{22}{1000}$ of a second per day. The clock is in a brick room which is inside of another brick room in the basement of the building. The temperature is controlled by a thermostat which operates a gas stove, and controls the temperature of the space between the two rooms within 1 degree. Inside the clock room is another thermostat which controls a set of incandescent lamps, by means of which the temperature is controlled within a few hundredths of a degree. So delicate is this thermostat that the incandescent lamps, though situated at a distance of 6 or 8 ft. from it, cause it to turn them off or on frequently as often as once in 2 seconds. The clock is under the most perfect conditions, constant temperature and constant pressure.

We have one machine there which will be of interest to all. The Local Committee has arranged a very warm reception for you, warmer than intended; we will try to give you a cold reception this afternoon, because we are going to show you our ice machine.

Another feature is our automobile testing department. I suppose all of you who were at the World's Fair in St. Louis noticed the locomotive testing department. We are building a similar equipment, so that an automobile can be tested in every way.

We will, also, show you the dynamo-room in the electrical engineering department, in which the machinery is about the same as in any engineering laboratory. One machine in which you might be interested, the largest we own, is a 40-kw. dynamo, for electro-metallurgical work, designed and built at the school. The voltage of the current is only 20, and so the wires can be handled with safety. We use this current in making aluminum and in other electro-metallurgical processes.

Mr. John D. Rockefeller has recently given us $200 000 for new laboratories, and with this money we are building a physics laboratory and a mining engineering laboratory. Engineers are always in favor of apparatus, and the professors of an engineering college

Address by Prof. Howe (continued).

believe that when a building is erected it should be well equipped. Unfortunately, professors in some institutions are able to get money for a building only, and must use a very meager equipment. We have been fortunate enough, however, to be able to lay aside, first of all, a definite sum for equipment, and then put the remainder into buildings.

Our physics laboratory will have $25 000 worth of new apparatus, and our mining engineering laboratory will be fully equipped with all kinds of mining machinery. We will be very glad to see you at Case School this afternoon. (Applause.)

Announcements.

Mr. Mordecai.—The other places that we will visit this afternoon, as laid out in the programme, are the works of The Wellman-Seaver-Morgan Company, and the power-house of the electric street car line on Cedar Avenue. I have been unable to get representatives of those two places to talk to you to-day, I think owing entirely to diffidence on their part. The Wellman-Seaver-Morgan plant is a very large plant for the manufacture of machinery for loading and unloading iron ore and coal.

The power plant at Cedar Avenue is similar to many throughout the different cities of the country, but is a very large and successful one. That is all, gentlemen, that I can present to you this morning.

The vehicles for going around on this trip this afternoon will be at the hotel at 2 o'clock. The special cars for the ladies, to go to the White City, will be here at 2 o'clock, that means 2 because we cannot hold the track for any length of time, and the ladies must be on hand at that hour to take the cars. Will you kindly see that your wives and sweethearts follow that direction?

Upon motion, duly made, seconded and carried, the convention adjourned until Thursday morning at 10 o'clock.

Fourth Session.

Fourth Session.—The fourth and last session of the Society was called to order at 10 o'clock Thursday morning, June 22d; President Schneider in the chair; Assistant Secretary McMinn acting as Secretary.

Announcements.

The President.—Before we proceed to the transaction of business the Secretary has some announcements to make.

The Assistant Secretary.—The following letters have been received, and are self-explanatory:

"Cleveland, O., June 21, 1905.

"Mr. Augustus Mordecai,

"Chairman Entertainment Committee,

"Hollenden Hotel.

"Dear Sir:—The Water-Works Department of the City of Cleveland would be very glad to receive a visit at its new pumping station at Kirtland Street, Thursday afternoon, from the American Society

of Civil Engineers. The station is a new one, from which all the water for the city is now pumped, and is likely to prove interesting to the Society.

"Very truly yours,
"E. W. BEMIS,
"Supt., Water-Works."

"THE WABASH RAILROAD COMPANY.
"ST. LOUIS, MO., June 12, 1905.

"MR. CHAS. WARREN HUNT,
"Sec'y., American Society Civil Engineers,
"New York, N. Y.

"DEAR SIR.—Concerning the annual convention of the American Society of Civil Engineers, which is to be held in Cleveland. The writer begs to call attention of the members of the Society to a lift bridge which is being built in Cleveland under his supervision, for the Wheeling & Lake Erie R. R., in which some of the members may be interested.

"The bridge referred to is a Strauss Trunnion Lift for single-track railroad, having one-leaf span of 150 ft., built according to Wabash R. R. specifications.

"In connection with this bridge, there is a temporary lift span of 85 ft. in operation, to carry trains over the navigation channel.

"The writer expects to be in Cleveland on the 22d and 23d of June, and will then be pleased to take any of the members who care to, to the bridge site to explain the points and other engineering features in connection with the bridge.

"Yours truly,
"A. O. CUNNINGHAM,
"Bridge Engineer."

THE PRESIDENT.—Some gentlemen will now address this meeting on several engineering subjects. Mr. Mordecai, Chairman of the Local Committee, will please take the chair and introduce the speakers.

Mr. Mordecai took the chair.

MR. MORDECAI.—Gentlemen: We tried yesterday to show you some of the institutions of Cleveland, but, of course, did not show you all of them. One, especially, in which Cleveland was very largely interested and is now, refers to electric lighting and the development of electricity. One of our citizens, Mr. Charles F. Brush, is very largely interested in that, and if he will kindly tell us about it we will be very much obliged. I have the very great pleasure of introducing Mr. Brush.

Address by Mr. Brush.

MR. BRUSH.—Mr. Chairman and Gentlemen: A day or two ago Mr. Mordecai was good enough to ask me to say a few words historically about the electrical interests of Cleveland. This is a rather large subject; he said he wanted me to occupy perhaps five minutes or so. If this subject were treated exhaustively it certainly

Address by Mr. Brush (continued).

would fill a large volume, and contain, I think, many interesting chapters.

Cleveland may perhaps be justly regarded as the home of electric industries. Many of the most important of these industries originated here, and others are and have been closely associated with the place.

Away back in the Fifties our eminent citizen, the late J. H. Wade, was the first General Manager of the Western Union Telegraph Company; after that, he superintended the construction of the first transcontinental telegraph line, and associated with it several warring telegraph companies in California, forming, altogether, the Pacific Telegraph Company, of which he was the first President. Later, he succeeded in consolidating this company with the Western Union and became President of the combined concerns, which position he occupied for many years.

If I am not mistaken, the very first telephone instruments that left Professor Bell's laboratory, about 1876, I should say, were brought to Cleveland by one of our enterprising citizens, Mr. Stockley, and exhibited here. This was soon followed by the erection of several private telephone lines, and not long afterward by the organization of the Cleveland Telephone Company which opened one of the very first telephone exchanges in existence; I don't remember the exact date of that.

The electric arc-light industry originated in Cleveland in the late Seventies. Its birth was marked by the invention and development of the series arc lamp in 1877 and 1878. It was this invention which made arc lighting from central stations commercially possible. The next year, 1879, witnessed the organization here of the first central lighting station in the world, and during the same year our public square, the little park that you have seen, was lighted by twelve arc lights. This is interesting, because it was the first instance anywhere of public street lighting on a commercial scale.

Of course, the carbon industry accompanied the arc-lighting industry; it was necessary to it, and was developed here in connection with it, and is an industry which you know has grown to large proportions. Of course it is entirely dependent upon the growth of the arc-lighting industry; it cannot exceed the growth of that, because that is the only customer for its product, and hence the growth of the carbon business forms a very good index of the growth of the arc-lighting industry. It is interesting to note that within the first fifteen or twenty years of the beginning of the business the annual consumption of carbons had reached about 200 000 000.

The electric storage battery was also invented and developed here, commencing about 1878-79. This is very largely used now in power and lighting stations as well as for the propulsion of automobiles,

and, quite appropriately, electric automobiles are now built in Cleveland in large numbers.

Electric smelting, another of the industries which has grown from very small beginnings and reached large proportions, was invented and developed here by the Cowles Brothers in the very early Eighties.

Some of the very earliest pioneer traction work was done here; this is especially true of the underground trolley. I think the latter was the very first that appeared anywhere; it was worked on quite a large scale by Messrs. Bentley and Knight, two young men from Washington.

I regret to note an exception in the line of the lighting industry which started here, but I must say that the incandescent lamp was not invented here, as you all know. However, one of the earliest and largest factories for its manufacture was established here in connection with the arc light.

There can be no doubt that the early commercial success of arc lighting prompted and hastened the development of incandescent lighting as well as of power transmission and electric traction; it was the seed, the root, the parent, from which these industries sprang. The capital invested in these various electrical industries, the seed of which was sown here, has grown from virtually nothing in 1878 to more than $4 000 000 000 in this country alone, and this remarkable growth is increasing at a greater rate than ever, while the end certainly is not in sight. I thank you, gentlemen, for your attention. (Applause.)

Mr. Mordecai.—The City of Cleveland is proposing to make very extensive improvements in its public buildings, and has elaborated quite a large plan. I will ask Mr. Hill to explain it to us.

I have the pleasure of introducing Mr. Thomas W. Hill, President of the City Hall Commission.

Address by Mr. Hill.

Mr. Hill.—Mr. President and Members of the American Society of Civil Engineers: I am sorry, on your account, that the Chairman of the Grouping Plan Committee of our Chamber of Commerce, Mr. W. G. Mather, is out of the city and therefore unable to present to you an explanation of this important feature of our city's notable improvements, but I know you will be charitable toward, and not expect as good things from, a substitute.

Few people in this busy commercial age appreciate fully the desirability of beauty in a municipality, but civic beauty and civic pride are twin sisters. The World's Fair in Chicago, 12 years ago, was undoubtedly the starting point of American ideas as to the artistic and harmonious arranging of public buildings, and the expositions that have been held since have emphasized most thoroughly the possibilities in this regard.

Address by Mr. Hill (continued).

In this city the group plan agitation was taken up and started ten years ago by the members of our Architectural Club. Soon thereafter our Chamber of Commerce also took up the matter, giving it their unqualified support, and appointing a committee which was assisted by two members from each of the three commissions having in hand the projected public buildings. Their efforts were successful in having passed by the State Legislature a bill providing for an expert commission to have in charge and direct the work. Governor Nash appointed on this commission Messrs. Daniel H. Burnham, of Chicago, John M. Carrere and Arnold W. Brunner, of New York, who accepted the task, and in August, 1903, reported the plan which is hanging before you here, and which was adopted by the city. Since that time the efforts of the city have all been in the direction of the fulfillment of this plan. The expert commission in their report to the Mayor said:

"The opportunity of grouping the principal buildings of a city of the size of Cleveland, and providing for them the proper setting in the way of approaches and other accessories, has never before come to any city."

The facts were that the Federal Government had commenced the building of a $3 000 000 Post Office; we had never had a City Hall, having occupied rented quarters for more than 30 years; had absolutely outgrown our County Buildings, erected 40 years ago; and had sold the Public Library and Educational Headquarters, so that there were four new building projects just before us. The group idea is growing in our country. Washington, with its magnificent plan, practically bequeathed by the Father of his Country, might be mentioned first in public interest. Harrisburg, where the movement was started by a woman, carried a favorable vote at the polls, and that small city is to spend more than $1 000 000. Buffalo, Chicago, Baltimore, St. Louis, New York, San Francisco, Detroit and Hartford are all doing something in this line. Ottawa, the Canadian Capital, is trying to make herself the Washington of the North, and Mr. Burnham has been sent by our Government to the capital of our far eastern territory to arrange for the artistic regeneration of Manila.

For our own city's scheme, we have bought four city blocks on the lake front, which are located four blocks from the present City Hall and Superior Street, on which street is the Hollenden Hotel, your convention headquarters. These blocks are each 581 ft. in length and 262½ ft. in width, and contain, including the streets surrounding them, 9 acres. They abut on a hillside park of 10½ acres, which lies between them and the tracks of the Lake Shore Railway. Beyond the railway tracks, and bordering on Lake Erie, there will be a park, of made land, of about 34 acres, about 15 acres of which

are now filled in, and ready for improvements. The four blocks cost the city and county $1 650 000, which we think very cheap when we consider the central location and area. The buildings found on the lots were mostly old; very few were expensive.

There are two plans covering the same territory. The first only contemplates the purchase of enough land to widen Wood Street to 530 ft., and to use all land purchased for either street, sidewalk or park purposes. The land would cost about $2 500 000. The other and broader plan is to purchase all the land between Bond Street on the east, Superior Street on the south, Ontario Street on the west, and Lake Street on the north. This would cost about $3 000 000 more, but quite a large portion of this, it is planned, would be resold, with restrictions as to the kind of buildings to be erected thereon, thus controlling all the property facing either the Mall or the Public Buildings. The City Hall is expected to cost $1 500 000; the Court House, $3 500 000; the Library and Educational Headquarters, approximately, $1 000 000; the improvement of the Mall about $900 000, making a total cost for land, buildings and improvements of about $13 000 000. Enough land would probably be resold to reduce the net cost by $2 000 000 or perhaps $3 000 000. We estimate that the grouping plan has added to the cost about 25 to 30% more than what would have been expended had each building been erected independently, but had they been so built, smaller and probably much more expensive sites would undoubtedly have been selected.

A brief explanation of the map may leave the situation more clearly in your minds.

The Government Building having been commenced, the architects were obliged to make it the axis of everything they planned. After widening Wood Street, the plan is to place the County Building at the head of and closing Ontario Street north of Lake Street. The City Hall is to be similarly located at the head of Bond Street, while the present City Hall site would be occupied by the Library Building, thus balancing the Federal Building at the south end of the Mall. It is hoped and expected that the railroads will build, at the north end of the Mall, a Union Station which will be in harmony with the Public Buildings. The passenger steamers would then land their passengers at the docks at the foot of Erie Street, practically all visitors to the city being brought, through a magnificent entrance or gateway, into a most attractive and impressive section of the city, so that their first impression, usually lasting, could not help but be favorable.

Our citizens, almost unanimously, approve of the group plan, and consider the increased cost very small, when compared with the permanent advantage of executing so broad an architectural plan.

Address by Mr. Hill (continued).

The increased value to surrounding property will be considerable, as the section being used was not of high grade, and it was really an excellent move to tear down many of the old buildings, they having outlived their usefulness.

Beyond all financial consideration, however, the city will derive large benefits from its foresight in preparing the way for what must be, if consummated, a source of great pride in the years to come; a civic accomplishment which will compare most favorably with the grand architectural effects which in European cities command the respect and admiration of the world. (Applause.)

Mr. Mordecai.—As this is the last meeting of the Society, on behalf of the local membership I wish to thank the Convention for their kindness in coming here, and wish you all a safe and happy journey home. (Applause.)

BUSINESS MEETING.

(Adjourned from June 20th, 1905.)

Business meeting resumed.

Thursday, June 22d, 1905.—The President resumed the chair.

The President.—This meeting will now come to order for business. The first order of business is the report of the Board of Direction in the matter of the resolutions adopted at the Annual Meeting, January 18th, 1905, relating to the nomination by the Society of members to serve on technical or other commissions.

The Assistant Secretary read the following:

Report *re* members to serve on Technical Commissions.

REPORT OF BOARD TO THE BUSINESS MEETING OF THE CONVENTION *IN RE* RESOLUTIONS ADOPTED AT THE ANNUAL MEETING, JANUARY 18th, 1905.

"*To the American Society of Civil Engineers:*

"At the Annual Meeting held in New York City, January 18th, 1905, the following resolution was adopted:

"(1) *Whereas,* It has been at times in the past, and may be in the future, suggested that members to serve on technical or other commissions, or to render special professional services, be nominated by the American Society of Civil Engineers, and

"(2) *Whereas,* No provision now exists in the Constitution or rules of the Society authorizing and governing the making of such nominations.

"(3) *Whereas,* It is proper and desirable that the attitude of the Society in reference to making such nominations shall be determined and expressed; therefore,

"*Resolved,* That the Board of Direction be requested to consider the propriety and advisability of the Society making such

recommendations or nominations from among its own members, or others, for special positions or services; to take measures, if they shall deem it advisable, to ascertain the views of the membership on the subject; and to submit to the next Annual Convention its conclusions and recommendations in the matter.

"In compliance with this resolution, the Board of Direction has considered the subject matter of this resolution and submits to the Society, in Convention assembled, its conclusions and recommendations, as follows:

"The Society will best serve, not only its members and the Profession, but also the Public, by limiting its activities as an organization to the objects wisely laid down in its Constitution, *viz.:*

" 'The advancement of Engineering knowledge and practice and the maintenance of a high professional standard among its members.' To attain these objects provision is made for meetings for social and professional intercourse, the presentation and discussion of papers, the publication of papers so presented and the maintenance of a library. No action to promote the personal welfare of members, other than may result from the means thus specified, is anywhere provided for, but on the contrary the true intent of the Society is clearly shown in the definite prohibition of papers 'specially advocating personal interests.'

"To further guard and perpetuate the impartial and impersonal attitude of the Society, every publication of papers and discussions is preceded by the statement that 'The Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.'

"It has been determined that in pursuance of its aims, the Society may with propriety confer upon members who have contributed papers elucidating marked advances in principles and methods of design and construction, premiums commemorative of such contributions; and also that it may with propriety, either alone, or in co-operation with other scientific organizations, take steps toward the formulation of expressions of opinion as to the best methods of securing uniformity of practice in the investigation of engineering problems of a particular class, and the form in which the results of such investigations should be presented in order to be readily compared.

"The care taken in the selection of members of the Society to take part in the formulation of such methods of procedure, as evidenced by the provisions of the Constitution on that subject, shows very clearly the caution with which the Society approaches the question of taking any action which may lead to even a nominal expression of opinion on engineering questions concerning which divers opinions may be properly entertained. The subject has to be considered by the Board of Direction and also by the Society in general meeting, which can only by a two-thirds vote direct the Board to obtain an expression of opinion from the Society by means of a letter ballot, and, finally, the letter ballot fails unless an unusually large number of members show interest in the matter.

"This very deliberate mode of procedure was adopted by the Society after long and careful consideration. At the same time the

Report *re* members to serve on Technical Commissions (continued).

policy of the Society with reference to such special committees was thus determined, the question (now again raised) as to the propriety of the Society to take part in the appointment of Commissions to investigate subjects of local interest only, was also very thoroughly canvassed, with the result that at the Annual Convention in 1876 it was unanimously resolved 'That in the opinion of this Convention it is inexpedient for the officers of the Society to take action upon application for members to perform professional services.' This has been the prevailing sentiment in the Society for twenty-five years, and no apparent reason exists for any change in its policy and practice in this respect. The adherence to this policy has resulted in the steady advance of the Society in efficiency and influence, and in its freedom from all imputation of being an association for promoting the pecuniary or other personal interest of any of its members.

"Prominent among the disadvantages that would accrue from the assumption by the Society of the selection of members of Boards or Commissions to consider questions of local policy, is the certainty that strong influences, both external and internal to the membership, would be brought to bear on the agency through which the selections would be made, and that such influences would occasionally extend even to the composition of the appointing agency. Furthermore it is certain that the selection by the Society, of persons to perform certain duties with no control by the Society over the manner in which such duties may be performed, cannot be looked upon as furthering the advancement of engineering knowledge and practice.

"The Board of Direction is therefore of the opinion that the nomination by the American Society of Civil Engineers, or by its officers, of persons to serve on technical or other Commissions, or to render special professional services, does not come within the scope of the purposes for which the Society was organized and exists, and that the making of such nomination is not advisable.

"By order of the Board of Direction,
"CHAS. WARREN HUNT,
"Secretary."

MAY 2D, 1905.

Report accepted and adopted.

JAMES OWEN, M. AM. SOC. C. E.—If it is necessary to have a motion, I move that the report be accepted and adopted.

THE PRESIDENT.—Any remarks? All in favor of the motion please say Aye; those opposed No. The ayes have it, and the motion is carried.

The next business is the time and place for holding the next Annual Convention. We will have read the report of the Secretary on this matter.

The Assistant Secretary read the following:

REPORT OF THE SECRETARY OF VOTES RECEIVED AS TO THE TIME AND PLACE FOR HOLDING THE ANNUAL CONVENTION OF 1906.

Report on Time and Place for next Convention.

"Total number of votes received, 599.

"As to the place of holding the Convention, as follows:

Duluth, Minn.	348	New York City	8
Boston, Mass.	28	Mackinaw Island	7
The Thousand Islands	22	Mexico City, Mex.	7
Chicago, Ill.	16	Havana, Cuba	6
New Orleans, La.	11	Minneapolis, Minn.	6
Saratoga, N. Y.	11	Panama	6
Denver, Colo.	10	Cleveland, Ohio	4
San Francisco, Cal.	10	Montreal, Canada	4
Pittsburg, Pa.	10	Philadelphia, Pa.	4
Washington, D. C.	10		

"The following have 3 votes each:

Atlanta, Ga.
Atlantic City, N. J.
Manhattan Beach, N. Y.

"The following have 2 votes each:

Birmingham, Ala.
Baltimore, Md.
Hot Springs, Va.
Indianapolis, Ind.
Kansas City, Mo.
Louisville, Ky.
Norfolk, Va.
Niagara Falls, N. Y.
Portland, Oregon.
Richmond, Va.
Sault Ste. Marie, Mich.
St. Paul, Minn.
Seattle, Wash.
Toronto, Canada.
White Mts.

"The following have one vote:

Portland, Me.
Milwaukee, Wis.
Lake Minnetonka, Minn.
Lake Champlain.
Special Steamer on Great Lakes.
Vicinity of New York.
Chattanooga, Tenn.
Cincinnati, Ohio.
Cresson, Pa.
Paris, France.
White Sulphur Springs, Va.
Harrisburg, Pa.
St. Louis, Mo.
Salt Lake City, Utah.
Mt. Desert, Maine.
El Paso, Texas.
Yellowstone National Park.
Detroit, Mich.
Cape May, N. J.
Memphis, Tenn.
Providence, R. I.
New England.
New England Coast.
Rochester, N. Y.
Omaha, Neb.

"Any summer resort with hotel large enough to accommodate Convention, 6 votes.

Report on Time and Place for next Convention (continued).

"As to the time for holding the Convention the following votes have been received:

January	6	August	44
February	3	September	18
March	6	October	8
April	10	November	2
May	22	December	1
June	256	Summer	4
July	106	Early fall	1

"Respectfully submitted,

"Chas. Warren Hunt,
"Secretary."

"New York, June 15th, 1905."

Discussion on Time and Place for next Convention.

The President.—This is now open for discussion. Are there any remarks?

George F. Swain, M. Am. Soc. C. E.—I move that this matter be referred to the Board of Direction with power.

The President.—Any remarks?

(Cries of "Question!")

Emil Swensson, M. Am. Soc. C. E.—I understood there was a motion to be made, in reference to the report which the Assistant Secretary has read; in other words, that a suggestion by one of the members had been made here in the shape of an amendment or some modification of that general reference. I know it is the practice, and always has been, to refer this to the Board; at the same time, at a number of conventions where these votes have been returned, there has always been some suggestion or some expression of opinion, not with a view of binding or influencing the Board in any other than a suggestive way. Those who happen to be at a convention know the conditions, and knowing, from what they have, what they would like to have next year, an amendment might bring before us a thought of the kind of a place at which we would like to meet, and what sort of a convention we want to have. It has always seemed to me, from attending a great number of conventions, that a suitable place for this Society to meet would be a large hotel where all the members are gathered under one roof, at some place where the air is pure, and where life smiles upon us all; and I understand that the suggestion in the resolution before you be referred to the Board. I hope that the Board will consider it and think of some resort on the coast of New England, or on the Great Lakes or the lakes of New York, or at the Thousand Isles, or some place of that kind, where this great body can get together in one hotel, where everybody can find everybody in the lobby, with plenty of ventilation and plenty of fresh air, and with clear heads and cool bodies we may discuss those things which are serious and play with those things which are amusing.

THE PRESIDENT.—As the resolution has already been introduced, I suppose this has to come in the shape of an amendment.

MR. SWENSSON.—I offer this resolution:

"*Resolved,* That the sense of this meeting is that the 1906 Annual Convention of the American Society of Civil Engineers be held at a summer resort having a hotel large enough to accommodate the entire attending membership, and that the time of holding said convention shall be the latter part of May if the place is in the southern half of the United States, and in the first part of June if the place is in the northern half.

"*And it is further Resolved,* That the selection of the place of meeting be referred to the Board of Direction with power to act under the above resolution."

(Seconded.)

MR. MORDECAI.—Can you get a hotel large enough to allow the Board of Direction to follow out that resolution, to accommodate all the delegates attending. I would suggest that the resolution be modified in that respect as much as possible.

MR. SWENSSON.—It is modified by introducing the words "if possible," and accepted.

THE PRESIDENT.—That is intended to be an amendment to Mr. Swain's motion. Mr. Swain, do you accept the amendment?

MR. SWAIN.—I accept the amendment.

F. A. COKEFAIR, ASSOC. M. AM. SOC. C. E.—I would like to offer a suggestion as to the time, namely, the month of May. I represent the interests of our local members of Duluth, and the citizens there are very anxious that this convention be held at that place. The climate is not desirable in the month of May, June is very much better, the latter part of June would be very desirable. It is always cool and pleasant at that time, and the citizens are very anxious that this convention be held in Duluth.

Major Charles L. Potter was appointed by our local members, nine of them, and by the citizens of Duluth, to be present at this convention, and be assured that the convention will meet next year in Duluth. Major Potter, unfortunately, on account of the limitation of his leave of absence, was obliged to leave on Tuesday, and he left with me a written statement as to what he would have said at this meeting. If it would not be out of order, I would like to read what Major Potter has to say.

THE PRESIDENT.—Do the members present desire to hear Major Potter's statement?

MR. GREEN.—This being in writing, wouldn't it be quite as well if that was presented to the Board of Direction, as they have that question in hand.

MR. CROES.—The question as to the place and time of holding the convention will not be determined at this meeting. It has always

Discussion on Time and Place for next Convention (continued).

been customary to place the matter in the hands of the Board of Direction for them to arrange. The general sentiment of the Society, with reference to the place, having been determined by the vote of the convention, and if proper accommodations can be obtained in the locality, not necessarily a city, but adjacent to a city or to some special district, this can be made by the Board of Direction only, or by the Secretary at times. The matter is left generally to the Board of Direction without positive instructions as to time and place, and I think that that will be preferable, as in the resolution here. We are not here to listen to arguments with regard to special localities, because the exact time and locality cannot be fixed by this Convention.

Mr. H. S. Haines.—I suppose that if Major Potter had been present, this meeting would not have objected to hearing what he had to say upon this subject, and, therefore, out of respect to the gentleman, I should think that we should hear the written statement that he has left here. Therefore, I move that Mr. Cokefair have permission to read the statement which Major Potter has prepared.

(Seconded, put and carried.)

The President.—Mr. Cokefair will kindly read the statement.

Mr. Cokefair then read the following:

"Cleveland, June 20, 1905.

"Mr. F. A. Cokefair,

"Dear Sir:—I regret that the matter of the location of the next meeting of the American Society of Civil Engineers did not come up to-day, as I am forced to leave town to-night. I have hurriedly written about what I would have said, and request that you read the same to the members, adding whatever remarks you may wish to make in regard to the matter.

"Very respectfully,

"Chas. L. Potter."

"Cleveland, O., June 20, 1905.

"*To the Members of the American Society of Civil Engineers.*

"Gentlemen:—I come here to represent a small city in the Great Northwest—Duluth—the city that made Proctor Knott famous. We want the American Society of Civil Engineers to hold its next annual convention with us.

"Whenever the word Duluth is mentioned, it generally brings forth a shiver and a request for information as to how many weeks it takes to get there and back. But Duluth is not inaccessible, it can be reached in about twelve hours from Chicago by one of the best equipped trains in the Northwest, and from Minneapolis and St. Paul by at least nine first-class trains every 24 hours, and it can be reached by boat from Buffalo in 4 days, making one of the most beautiful trips in the world.

"Three large steamers, the *Juniata* and *Tionesta,* of the Anchor

Line, and the *North West,* of the Northern Steamship Company—three floating palaces—cover this route. They leave Buffalo and make their first stop at the beautiful City of Cleveland, then at Detroit, Mackinac Island, the Soo, Marquette, Houghton, and finally Duluth. They pass by daylight through the Detroit River, St. Clair River, St. Mary's River and the Portage Lake Ship Canals, in all of which the Government has done extensive works of improvement. They stop at Mackinac long enough to drive around the beautiful island. Undoubtedly, the stop at the Soo can be made long enough to visit the power plant of the Lake Superior Company, and at Houghton long enough to visit the great Calumet and Hecla copper mine, its stamp mills and smelters.

"At Duluth you will have one of the greatest lessons to be found anywhere in the expeditious handling of freight from land to water, and from water to land. Duluth-Superior Harbor ranks fourth among the ports of the United States in receipts and shipments of freight, and when you remember that this tonnage is handled in an open season of from 7 to 8 months, you can get some idea of the rate at which the work is carried on.

"Duluth-Superior Harbor is one of the finest natural harbors in the country, having 49 miles of available water front. We have the largest ore docks in the world, the largest elevator in the world; saw mills that turn out from 400 000 000 to 500 000 000 ft. of lumber each year; a most modern blast furnace, with coke ovens attached; the largest draw-bridge in the world, and the aerial ferry—the only one in the United States, and the third in the world.

"But, I think, the invitation and circulars sent out by our Commercial Club give you all of these attractions and statistics.

"As trips of interest, we have first the Minnesota iron mines. To the majority of you this probably means simply holes—dark holes—in the ground, but most of our mines are different from anything else in the country in that there are no shaft houses and hoistings rigs, but plain open pits, some of them covering hundreds of acres, where the iron is mined with steam shovels on railroad tracks, dumped into cars and started directly on its long journey by land and water to Pennsylvania, which only a few years ago was practically the only iron-producing State. When once started it never stops until its journey is finished; the time of transfer from rail to steamer is so slight that it cannot be considered as a stop, but merely a slowing down for a few minutes. Several of these mines reach their million tons per annum, and the cost of mining, loading and starting on its long journey is only a few cents per ton.

"To these mines, which lie 70 miles north of Duluth, free transportation, by special train, will be furnished to members.

"The second trip of interest will be the harbor of Duluth-Superior, with its many plants for handling ore, coal, grain and lumber. Boat transportation will be furnished free, and an opportunity given to see many interesting features, including the plants just mentioned, the blast furnace with its coke ovens, and the Government works of improvement.

"At the Superior Entrance to the Harbor, the Government will be doing a work which has attracted engineers from all over the country and Europe, and even far-off, but mighty, little Japan. The

Discussion on Time and Place for next Convention (continued).

work consists of putting concrete successfully in mass at a depth of 22 ft. under water in two canal piers over a mile in combined length, and containing nearly 100 000 cu. yd. of concrete, 80% of which will be under water when completed. An inspecting engineer, now a member of the Panama Canal Commission, stated that he believed there was no better place in the world to see the successful handling of concrete under peculiar conditions.

"As a third point of interest, the Great Northern Power Company is developing electrically the St. Louis River above Duluth, and free transportation will be furnished to its works. As to what is being done, my colleague, Mr. Cokefair, will tell you something after I have finished.

"As a last, but by no means least, attraction, the members and the ladies (of course, the ladies are included in all of the trips) will be taken over the quite famous Boulevard Drive, along the hill several hundred feet above Lake Superior and overlooking the cities, the harbor and the lake.

"We have only a few members in Duluth, but we will try to make you, if you so favor us, remember pleasantly your visit to the 'Zenith City of the Unsalted Sea.'"

Mr. Oberlin Smith.—Will Mr. Cokefair please tell us something about the hotel facilities, and whether there is a large hotel?

Mr. Cokefair.—The largest hotel there is the Spaulding, 185 rooms; there are four other hotels, within one or two blocks of each other, having altogether 530 rooms, also a first-class hotel in Superior, a few miles by trolley, with 150 rooms. We thought perhaps we might charter a steamer and the members live aboard it. There is a good assembly room at the Spaulding Hotel; and the High School, which is the largest in the world, has a very fine assembly room which we could use. Duluth people are very enthusiastic about having you come there, and I am sure they will co-operate with the committee to make everything enjoyable. The climate is excellent in the latter part of June. We have a number of golf clubs, yacht clubs and clubs of all sorts, and beautiful drives. I think it has all the features which one of the members just spoke of as requisite for a successful meeting place.

W. M. Hall, M. Am. Soc. C. E.—In view of the number of votes cast for the meeting at Duluth, and in view of the statement that has been made, I would like to make a motion that the Board of Direction consider the advisability of meeting at Detroit and deciding on one of these steamers from Detroit to Duluth, and ending the annual convention at Duluth. I simply make that as a suggestion that the Board of Direction consider such a matter.

Mr. Swain.—At a meeting, and a very large meeting, having voted for Duluth, I think I ought not to accept the amendment which has been made, and I would ask that that be voted on first according to the usual rule.

The Assistant Secretary.—The original motion was that the matter be referred to the Board with power.

Mr. Swain.—I would like to suggest that I made a substitute motion that the whole matter be referred to the Board with power. I withdraw my acceptance of Mr. Swensson's amendment.

The President.—The original motion, as the Chair understands it, is to refer that matter to the Board of Direction with power to act. All in favor of the motion, please——

A Member.—I rise to a point of order. I believe Mr. Swensson's amendment has not been acted on.

A Member.—I will second that amendment of Mr. Swensson's, so as to bring it before the Society.

The President.—Then the amendment should be disposed of first.

N. P. Lewis, M. Am. Soc. C. E.—Mr. President, the amendment by Mr. Swensson is before the house, I believe. It seems to me that there was a limitation in that amendment which might prove unfortunate and embarrassing. If I remember correctly, it was to the effect that the convention should be held in the first part of June if it is held in the northern half of the country. It seems to me that limitation, "the first part of June," might be unwise, and that it would be better to say in the month of June, if Mr. Swensson would accept that. If he will accept it, I understand the amendment will take that form.

(Resolution re-read by the Assistant Secretary.)

Upon a vote being taken, the President declared the amendment carried.

Mr. Cokefair.—I move that an informal vote be taken to show the sense of this meeting as to the place for next year's convention.

The President.—The vote of the whole Society is expressed in the Secretary's report. Duluth has received 348 votes out of 599.

A Member.—Do I understand that this motion which has been carried commits the Board of Direction to the first part of the resolution, that is, preventing it from deciding in favor of Duluth?

The President.—I don't think so. This resolution does not prevent the Board from selecting any place after the Board is satisfied that the members attending the meeting can be accommodated, that is one of the points in that motion. There should be hotel accommodations for the members attending the meeting.

A Member.—Mr. President, as I remember the resolution, it spoke of a place in which one hotel should be large enough to accommodate the members under one roof.

Mr. Mordecai.—I suggested that.

The President.—It doesn't bind the Board of Direction in any way. The Assistant Secretary will now read the report from the Secretary on the International Engineering Congress.

Thereupon, the Assistant Secretary read the following:

Report on International Engineering Congress.

Report to the Business Meeting in Relation to the International Engineering Congress of 1904.

The International Engineering Congress publications have all been finished and issued, and the following is a brief summary of this work, which may be of interest:

"The conduct of this Congress, including the entire cost, was assumed by the Society, through the Board of Direction, January 5th, 1904. It was determined that all members of the Society be made Members of the Congress, and that others might become Members, entitled to receive all the publications of the Congress, on payment of a fee of $5. In view of the number of papers received, it became necessary to increase this fee on July 1st to $10. After the Congress was over, the price was fixed at $5 per volume, with a discount of 25% to Libraries, Technical Societies, Schools, etc. The total amount received to date from all these sources is $3 858.10.

"The first paper was received on March 29th, 1904, and between this date and October 1st, 83 papers were edited, printed in advance form, and circulated through Engineering Societies throughout the world for the purpose of securing discussion.

"The details of the large and international attendance at the Congress in St. Louis have already been published in *Proceedings* (Vol. XXX, page 414).

"Since the Congress, a stenographic report has been forwarded for revision to each of those who contributed to the oral discussion, and after these had been returned they were collated with the Papers and Written Communications on the general subject. The Author of each paper was given an opportunity to close the discussion, and the whole was published in six volumes, which, for the convenience of Members of the Society, were designated Parts A, B, C, D, E and F of Vol. LIV of *Transactions*.

"There were 36 specially selected subjects discussed, and 283 persons contributed either Papers, Discussions or Translations.

"Eighteen Nationalities were represented, as follows:

Country.	Papers.	Discussions.	Total.
United States	50	211	261
Great Britain	10	38	48
France	18	9	27
Germany	..	11	11
The Netherlands	7	2	9
Australia	..	7	7
Switzerland	1	6	7
Japan	5	..	5
Sweden	..	4	4
India	..	3	3
Canada	1	2	3
Denmark	1	2	3
Argentine Republic	..	2	2
Austria	1	1	2
Belgium	1	1	2
Russia	1	1	2
Cuba	..	1	1
Corea	..	1	1
Totals	96	302	398

"The publications of the Congress cover 3 398 pages, with 689 illustrations.

"The edition printed of each volume was 4 000, and separate pamphlets, covering each of the subjects, have also been printed for the convenience of those who do not care to purchase the entire set. In all, 43 575 separate pieces have been handled.

"3 212 Members of the Society, 388 Subscribers, and 66 Authors (not members of the Society), a total of 3 666, have been supplied.

"It is not possible to give the exact cost of the work of this Congress, because some bills for printing are still outstanding, but a careful estimate of these shows that the total gross cost to the Society, including all preliminary and other expenses, will be approximately $35 000. Deducting the amount received to date for subscriptions, etc., the net cost to date is about $31 000, which will be reduced somewhat by future sales.

"CHAS. WARREN HUNT,
"Secretary."

"NEW YORK, June 14, 1905."

THE PRESIDENT.—This is just a report for information and requires no action.

Is there anything under the head of Unfinished Business?

Engineering Exhibit and Headquarters at the St. Louis World's Fair.

ROBERT MOORE, PAST-PRESIDENT, AM. SOC. C. E.—Mr. President and Gentlemen: It may possibly be of interest to those who are assembled here to say a word in regard to the exhibit which the Society authorized at the St. Louis World's Fair, and I do this on behalf of the committee. The purpose of this exhibit, on the part of the Committee, was primarily to render service to the visiting members and to our guests, foreign engineers from all parts of the world, and this was the primary object held in view by the Committee from the start. With that in view, they established Headquarters in the center of the Liberal Arts Building, arranged for constant attendance and for persons to render the visiting engineers all possible assistance and information that they could; at the same time a booth was put up—you will all remember—in which the exhibits by Members of the Society were displayed. I will not say anything about the character of that booth, nor the character of the exhibits, which you have seen no doubt for yourselves, but, as expressing the verdict of the Louisiana Purchase Exposition, and the Jury of Awards, I will say that the exhibit of the Society, which was a collective exhibit, received a Grand Prize, which is the highest possible award that they could make.

A diploma conveying this award will in due time be forwarded to the Society, and under the rules of the Exposition, a copy of this diploma will also be forwarded to every member who contributed to this exhibit. I will further say that, of the total appropriation of $8 000 made by the Society for this purpose, $1 000 was never drawn

by the Committee. Of the $7 000 which was drawn, about $200 was returned after all the bills were paid. (Applause.)

Telegram to Mr. Hunt.

MR. MORDECAI.—I think we all regret, especially the local members, the absence of Mr. Hunt. I therefore would move that the Assistant Secretary be authorized to send him a telegram expressing our regret at his absence, and our hope that he will soon regain his usual health.

Seconded, and carried unanimously.

Resolutions of Thanks.

MR. OWEN.—Mr. President, I think it will be in order at this time, before we finally adjourn, to make a motion that the thanks of the American Society of Civil Engineers be tendered to the Local Committee of this Society, and also to all the different organizations in the City of Cleveland, for the kind and generous courtesies we have received, and the royal manner in which they have entertained.

L. L. TRIBUS, M. AM. SOC. C. E.—I was about to make the same motion, and so I will very heartily second that.

Motion carried unanimously by a rising vote.

MR. MORDECAI.—On behalf of the Local Committee, I thank the Society for the vote.

Discussion on Local Associations Resumed.

THE PRESIDENT.—The time for adjournment is about here, but there was a motion pending at our first meeting in reference to the proposed formation of local associations of members of the American Society of Civil Engineers. The Chair wishes to state that this subject is not put before this meeting for any action. The Board simply desires an expression of opinion on this subject from the members coming from different sections of the country. All the action which can be taken on this subject has already been taken by the Board. That is, all the action which can be taken within the limits of the Constitution and By-Laws of the Society. They report simply as giving the members of the American Society of Civil Engineers, residing at different places, the rights which they already have, or rather recognizing the rights which they already have in forming associations. Mr. Green, will you, therefore, kindly withdraw your motion?

MR. GREEN.—I certainly do if it is declared out of order, or unnecessary. At the time I made the motion I think I explained that I did not know just what we were expected to do in regard to the report on this subject, and I thought it meant that some action was expected. My idea was that it should be agreeing with the Board. I understand now that it was only to obtain the ideas of the different members on the subject. The Board, I understand, has the right to organize and report any of the organizations of members that may be formed.

THE ASSISTANT SECRETARY.—I believe it would not be entirely out of place for Mr. Green not to withdraw his motion. That

motion is that the suggestion of the Board of Direction of the plan for the organization of local associations of this Society be approved by this meeting. There will be no harm in approving that. It is merely an expression of opinion of the Convention as to the action of the Board.

Mr. Green.—In that line, Mr. President, I renew the motion, that the meeting approve the proposition of the Board of Direction.

The President.—Any remarks?

Mr. Croes.—The action of the Board is simply that the Board recommends that wherever possible steps be taken calling the attention of the membership to this matter, and that such associations be formed; and then it states the conditions under which such associations may be organized entirely as parts of the American Society of Civil Engineers, without introducing members of other societies and allowing them to call themselves members of a chapter or section or local association, or whatever it is.

(Cries of "Question!")

Now, if any motion is necessary at all, it is a resolution to the effect that the action of the Board be approved.

The President.—The motion has been seconded. It is as follows: "That the suggestion of the Board of Direction of the plan for the organization of local associations of this Society be approved by this meeting."

Motion put and carried.

The President.—Are there any announcements to make?

Announcements.

W. J. Carter, M. Am. Soc. C. E.—On Friday the boat will leave the foot of Superior Street for Lorain, at 9:30 A. M., and returning will reach the city at 5 P. M.

Mr. Mordecai.—I will also state, as to the trip to the manufacturing plants this afternoon, that we would like to accommodate the convention in every way possible, to see what they will, but we would like them also to accommodate the Local Committee in their grouping. If they want to see the plants in the same or about the same locality we would like to put them all together. I think the Local Committee has arranged that the members of the convention will be received by all except the Refining Works and the National Carbon Works. If you will leave your names with the Assistant Secretary, stating what works you want to see, it will be satisfactory.

Resolution in reference to the Death of Messrs. Wellman and Morgan.

E. L. Verveer, Assoc. M. Am. Soc. C. E.—Owing to the unforeseen accident on the Lake Shore Railroad last night, I believe the result has been in the death of Mr. Charles Wellman, and also Mr. T. R. Morgan, of The Wellman-Seaver-Morgan Engineering Company. I think that as Mr. Seaver, and, I believe, Mr. Wellman are both members of this Society, it becomes the Society——

A Member.—They are not members; Mr. Seaver is.

Resolutions (continued).

Mr. Verveer.—I think it proper for the Society to express a vote of regret at this sad accident. I should like also to be enlightened by the Local Committee as to whether it would be proper to visit their plant to-day, under the circumstances.

Mr. Mordecai.—I had a telephone message, just before the meeting, stating that, under the circumstances, they would not like to open their works.

Mr. Verveer.—Then, Mr. President, I think it proper, and I would like to offer a motion, that we express a vote of sympathy to the firm, to Mr. Seaver and Mr. Wellman, in that sad occurrence which happened last evening.

The President.—Put your motion in writing.

Seconded and carried.

A Member.—I would like to move that the Society express to our Secretary, Mr. Hunt, our gratitude for his arduous labor in connection with the work of the Engineering Congress last year, and our appreciation of the manner in which that work has been done.

Seconded and carried.

The Assistant Secretary.—Members of the Nominating Committee should know that their meeting will be held in Parlor K at 8 o'clock this evening.

The President.—This meeting will please come to order. There is a gentleman here who has a resolution to offer.

Mr. Moore.—Mr. President, I desire to offer a motion that the thanks of this Convention be extended to the officials of the Erie Railway for the courtesies in extending free transportation to members coming to this Convention, which was apparently omitted.

Mr. Green.—Isn't the object of recalling the meeting to insure that that motion which was passed here—thanking the Local Committee, hotel people, railway company and everybody else, and every other organization which has contributed to the success of this Convention here, and to its pleasure—wasn't that motion intended to cover every one of these, and have them specified by name when it comes to be written out, as in previous conventions? Mr. Hunt generally made up the list, and looked out that it was all prepared beforehand so that it would include every one. The list can be made up so that they shall all be included by name individually.

A Member.—When Mr. Owen made this motion I asked him to include the Erie Railway and he replied that it was customary to tabulate the different ones who had tendered courtesies and kind reception, and that in this tabulation the Erie Railway would be included.

Mr. Verveer.—I think that under the circumstances the Erie Railroad has extended such exceptional courtesies that it would be quite appropriate to make a special resolution in their favor.

Seconded.

Mr. Moore.—With that understanding I will let my motion stand. I think they certainly are entitled to a special vote for the courtesy which they offered.

Carried.

Adjourned. Adjourned.

EXCURSIONS AND ENTERTAINMENTS DURING THE THIRTY-SEVENTH ANNUAL CONVENTION.

The arrangements for the Convention were in the hands of the following Committees:

Committee of the Board of Direction:

Alfred Craven, *Chairman;*

N. P. Lewis, Charles S. Gowen,
W. J. Wilgus, Chas. Warren Hunt.

Committee of Local Members:

A. Mordecai, *Chairman;*

Wm. J. Carter, F. C. Osborn,
Harry Fuller, W. P. Rice,
E. A. Handy, J. Ritchie,
A. M. Johnston, W. H. Searles,
M. W. Kingsley, S. T. Wellman,
J. Francis Le Baron, C. H. Wright.

By courtesy of the Erie Railroad, a special train, on which the transportation was free, was provided for the members of the Society and their families from New York to Cleveland. The party left New York at 1 p. m. on Monday, June 19th, 1905, and arrived at Cleveland at 6.45 a. m. next day.

The Erie Railroad Company also issued, upon application, passes, for all members of the Society and their families, good on any of its lines up to June 30th.

By courtesy of the Lake Shore and Michigan Southern Railroad Company, members of the Society from Chicago were also presented with free transportation over that company's road.

In the afternoon of Tuesday, June 20th, the Local Committee provided carriages for all members of the Society for a drive around the city, through the parks, and to the Country Club, where, by courtesy of the Club, refreshments were served.

In the afternoon of Wednesday, June 21st, visits were made to the works of the Brown Hoisting Machinery Company, the paint

works of the Sherwin-Williams Company, the works of the King Bridge Company, and the Case School of Applied Science. Visits were also made by small parties to the Power House of the Electric Street Car Line on Cedar Avenue, the new lift bridge being erected for the Wheeling and Lake Erie Railroad, and to several of the smaller industrial plants of the city. Visits were also made to Luna Park and the White City, free admission being granted by the management to all members of the Society.

In the evening there was a concert and entertainment at the Hollenden Hotel given by the Local Membership, after which there was informal dancing.

On Thursday afternoon, June 22d, visits were made to the Water-Works Pumping Station at Kirtland Street, and to various municipal works; and a golf tournament was held at the Euclid Club at which there was a large attendance.

In the evening, a reception was held at the Chamber of Commerce under the auspices of the Local Membership, and was attended by a large number of members and invited guests. Informal dancing was enjoyed to a late hour.

On Friday, June 23d, a large party left Cleveland at 9 A. M. by steamer for Lorain, Ohio, where they inspected the works of the National Tube Company, American Shipbuilding Company, and the terminals of the Baltimore and Ohio Railroad Company. The trip was a very pleasant one, lunch was served on board, and the party returned to Cleveland at 5 P. M.

THE ATTENDANCE AT THE THIRTY-SEVENTH ANNUAL CONVENTION.

The following 320 members were in attendance:

Affelder, L. J....Pittsburg, Pa.
Ames, G. M.,
Grand Rapids, Mich.
Andrews, Horace. Albany, N. Y.
Atwood, J. A....Pittsburg, Pa.

Babcock, W. S..New York City
Bacon, John W. Danbury, Conn.
Baker, Ira O...Champaign, Ill.
Baldwin, F. H..Bayonne, N. J.
Ball, C. B.....Chicago, Ill.
Ball, E. S.....New York City
Bance, C. W..Jersey City, N. J.
Barnsley, G. T....Pittsburg, Pa.
Beckwith, Frank,
Cleveland, Ohio
Beerbower, G. M. New York City
Begien, R. N.,
Morgantown, W. Va.
Bennett, L. J....Buffalo, N. Y.
Bensel, J. A....New York City
Benzenberg, G. H.,
Milwaukee, Wis.
Bernstein, L.,
Morgantown, W. Va.
Betts, E. E..Chattanooga, Tenn.
Beugler, Edwin J. Boston, Mass.
Biddle, John. Washington, D. C.
Bissell, F. E...Cleveland, Ohio
Blodgett, John...Pittsburg, Pa.
Blunt, W. T.....Toledo, Ohio
Brackenridge, W. A.,
Niagara Falls, N. Y.
Brackett, Dexter..Boston, Mass.
Brady, S. D.,
Parkersburg, W. Va.
Breuchaud, J.,
Croton-on-Hudson, N. Y.
Breuchaud, J. R.,
Croton-on-Hudson, N. Y.
Briggs, Josiah A. New York City
Brooks, Fred.....Boston, Mass.
Brooks, John P..Lexington, Ky.
Brown, C. C..Indianapolis, Ind.
Brown, T. E....New York City
Brown, W. P....New York City
Brunner, John....Evanston, Ill.
Brynn, P.....Pittsburg, Pa.
Burdick, C. B.....Chicago, Ill.
Burns, E. C..Jamestown, N. Y.
Buxton, Clifford...Toledo, Ohio

Carpenter, G. A.,
Pawtucket, R. I.
Carter, W. J...Cleveland, Ohio
Cartlidge, C. H...Chicago, Ill.
Chadbourn, W. H., Jr.,
Beaver, Pa.
Chamberlain, P. W.,
Washington, D. C.
Chapin, L. E.....Canton, Ohio
Chase, F. L...Jamestown, N. Y.
Chase, R. D....New York City
Chester, J. N....Pittsburg, Pa.
Childs, O. W....St. Louis, Mo.
Christian, G. L..New York City
Clark, C. H....Cleveland, Ohio
Coe, W. W.....Roanoke, Va.
Cokefair, F. A...Duluth, Minn.
Coleman, F. A..Cleveland, Ohio
Collier, B. C....New York City
Condron, T. L.....Chicago, Ill.
Conkling, L. D. Cleveland, Ohio
Connor, E. H.,
Leavenworth, Kans.
Cooper, S. L....Yonkers, N. Y.
Cowles, W. L.....Chicago, Ill.
Craighill, W. P.,
Painesville, Ohio
Crane, Albert S. New York City

Craven, Alfred..New York City
Creuzbaur, R. W.,
New York City
Croes, J. J. R...New York City
Cummings, Noah,
New York City
Cummings, R. A.Pittsburg, Pa.
Cunningham, A. O.,
Cleveland, Ohio
Curtis, V. P..Worcester, Mass.

Davis, C.....Allegheny, Pa.
Davis, C. S.....Toledo, Ohio
Davis, J. B..Ann Arbor, Mich.
Davis, James L.New York City
Davison, G. S....Pittsburg, Pa.
de Vou, J. L.....Pittsburg, Pa.
Didier, Paul.....Pittsburg, Pa.
Doane, W. A....Meadville, Pa.
Douglas, B.....Detroit, Mich.
Dunnells, C. G...Pittsburg, Pa.
Dyer, A. J....Nashville, Tenn.

Edwards, J. H....Oxford, N. Y.
Edwards, W. R..Baltimore, Md.
Ellis, John W.Woonsocket, R. I.
Ellsworth, E. A..Holyoke, Mass.
Emmons, C. M.,
Beaver Falls, Pa.
Evans, P. P....Cleveland, Ohio

Fanning, J. T.,
Minneapolis, Minn.
Fay, E. B.....St. Louis, Mo.
Fenkell, G. H.....Erie, Pa.
Firth, Elmer W.Brooklyn, N. Y.
Fish, J. C. L.,
Berlin Heights, Ohio
Flad, E.....St. Louis, Mo.
Floesch, J. M..Rochester, N. Y.
Foster, E. H....New York City
Frazier, J. W..Cleveland, Ohio
Frick, Walter...Lewisburg, Pa.
Fuller, Harry...Cleveland, Ohio
Fuller, W. B....Pittsburg, Pa.

Gahagan, W. H.Brooklyn, N. Y.
Garrett, J. T....St. Louis, Mo.
Gartensteig, C..New York City
Gast, E. A....Cincinnati, Ohio
Gates, C. L.....Toledo, Ohio
Gerber, E.....Pittsburg, Pa.
Gifford, G. E....New York City
Gifford, R. L.....Chicago, Ill.
Gillespie, R. H..New York City
Goad, C. E.,
Toronto, Ont., Canada
Goodrich, E. P..New York City
Gowen, C. S....Ossining, N. Y.
Graham, J. M...New York City
Gray, William..New York City
Green, B. R..Washington, D. C.
Green, R. B.....Detroit, Mich.
Greene, H. A...Pittsburg, Pa.
Gregory, C. E..New York City
Griggs, Julian..Columbus, Ohio
Gudmundsson, G.Pittsburg, Pa.

Haines, H. S...New York City
Hall, Julius R..Bethlehem, Pa.
Hall, W. M.Parkersburg, W. Va.
Handy, E. A...Cleveland, Ohio
Haring, James S..Crafton, Pa.
Harrison, C. L..New York City
Haskell, E. E....Detroit, Mich.
Haskins, W. J..New York City
Haven, W. A....Buffalo, N. Y.
Hayes, M. D.....Pittsburg, Pa.
Hayt, S. T., Jr..Towanda, Pa.
Hillyer, W. R.,
Port Richmond, N. Y.
Himes, Albert J.Cleveland, Ohio
Hoffman, Robert,
Cleveland, Ohio
Holman, M. L...St. Louis, Mo.
Horton, H. E.....Chicago, Ill.
Houston, G. N.,
University Park, Colo.
Hubbell, C. W...Detroit, Mich.
Hudson, H. W..Harrisburg, Pa.
Hughes, W. M.....Chicago, Ill.

Humphrey, R. L.,
Philadelphia, Pa.
Hunter, L. L....Pittsburg, Pa.
Huntington, G. D.,
Watertown, N. Y.
Hyde, A. L.....Columbia, Mo.

Jackson, D. C..Madison, Wis.
Jordan, E. C.....Portland, Me.
Judson, C. A...Sandusky, Ohio
Juengst, H. F.,
East St. Louis, Ill.

Kelley, W. D...New York City
Ketchum, M. S..Boulder, Colo.
Kielland, S. M....Buffalo, N. Y.
Kimball, G. A...Boston, Mass.
King, H. W...Cleveland, Ohio.
King, Wallace, Jr.,
New York City
Kingsley, M. W.,
Cleveland, Ohio
Kinsley, T. P...New York City
Kittredge, G. W.,
Cincinnati, Ohio
Knapp, L. H....Buffalo, N. Y.
Knowles, M.....Pittsburg, Pa.

Lane, E. G.....New Castle, Pa.
Laub, H.....Pittsburg, Pa.
Ledoux, J. W.Philadelphia, Pa.
Leffingwell, F. D.,
Montclair, N. J.
Leffler, B. R...Cleveland, Ohio
Leisen, T. A..Wilmington, Del.
Leonard, H. R.Philadelphia, Pa.
Lepper, F. W..Cleveland, Ohio
Lesley, R. W..Philadelphia, Pa.
Lewis, N. P....New York City
Lillich, Joseph...St. Louis, Mo.
Loomis, Horace.New York City
Loweth, C. F.....Chicago, Ill.
Lowinson, Oscar.New York City
Lynch, T. D.....Pittsburg, Pa.
Lyon, H. L.....Pittsburg, Pa.
Lyons, J. K.....Sewickley, Pa.

MacGregor, R. A.,
New York City
McDargh, H. J...Dayton, Ohio
McDonald, Hunter,
Nashville, Tenn.
McKenzie, T. H.,
Southington, Conn.
McKenzie, Thomas,
Westerly, R. I.
McMinn, T. J..New York City
Maignen, P. A.Philadelphia, Pa.
Manning, R. G...Toledo, Ohio
Mansfield, R. J.Cleveland, Ohio
Marple, W. M....Scranton, Pa.
Marvin, F. O..Lawrence, Kans.
Mason, A. J.....Chicago, Ill.
Maxwell, J. R....Newark, Del.
Metcalf, Leonard..Boston, Mass.
Miller, R. P....New York City
Minor, E. E..New Haven, Conn.
Montony, L. G....Troy, N. Y.
Moore, C. H.....New York City
Moore, J. E. A..Cleveland, Ohio
Moore, Robert....St. Louis, Mo.
Mordecai, A....Cleveland, Ohio
Morrow, J. J.Washington, D. C.
Morse, B. F....Cleveland, Ohio
Morse, C. M.....Buffalo, N. Y.
Moses, John C.Cambridge, Mass.

Nauman, G.....Harrisburg, Pa.
Neff, F. H.....Cleveland, Ohio
Nelles, G. T....Cleveland, Ohio
Nelson, A. H.....Pittsburg, Pa.
Nicholson, G. B.Covington, Ky.
Noble, Alfred...New York City

Oakley, F. T.....Toledo, Ohio
O'Brien, J. H...New York City
O'Rourke, J. F..New York City
Ostrander, J. E..Amherst, Mass.
Owen, J.....Newark, N. J.

Parmley, W. C..New York City

Parsons, W. B..New York City
Perrilliat, A..New Orleans, La.
Phillips, Asa E.,
Washington, D. C.
Pickett, W. D..Four Bear, Wyo.
Pierson, G. S..Kalamazoo, Mich.
Polk, W. A.....New York City
Pollock, C. D..Brooklyn, N. Y.
Potter, A.....New York City
Potter, C. L.....Duluth, Minn.
Potts, Clyde....New York City
Proctor, R. F....New York City

Quincy, C. F.....Chicago, Ill.

Rafter, G. W..Rochester, N. Y.
Raymond, W. G..Iowa City, Ia.
Reid, Homer A..New York City
Rice, W. P.....Cleveland, Ohio
Ricker, G. A.....Buffalo, N. Y.
Riegler, L. J....Allegheny, Pa.
Riggs, M. J.....Toledo, Ohio
Ripley, T. M....Marietta, Ohio
Ritchie, James..Cleveland, Ohio
Robinson, A. W.,
Montreal, Que., Canada
Rockwell, S....Cleveland, Ohio
Rohwer, H.....St. Louis, Mo.
Ruple, C. P....Cleveland, Ohio
Russell, R. L..Brooklyn, N. Y.
Russell, S. Bent..St. Louis, Mo.

Sabin, L. C.,
Sault Ste. Marie, Mich.
Sample, John H.Cleveland, Ohio
Sanderson, J. G..Scranton, Pa.
Schaub, J. W.....Chicago, Ill.
Schneider, C. C.,
Philadelphia, Pa.
Scott, Guy.....Wellsville, Ohio
Scribner, G. H., Jr.Chicago, Ill.
Searles, W. H..Cleveland, Ohio
Seaver, J. W...Cleveland, Ohio
Selby, O. E...Cincinnati, Ohio
Sherman, C. W...Boston, Mass.
Sherrerd, M. R..Newark, N. J.
Shima, T.....New York City
Smith, Edgar M...Chicago, Ill.
Smith, Oberlin.Bridgeton, N. J.
Smith, T. Guilford,
Buffalo, N. Y.
Spencer, J. C..Cleveland, Ohio
Spielman, J. G...Chicago, Ill.
Staley, Cady...Cleveland, Ohio
Stanton, R. B...New York City
Stern, E. W....New York City
Stewart, C. B....Madison, Wis.
Stowe, C. B....Cleveland, Ohio
Strehlow, O. E.South Bend, Ind.
Strobel, C. L...Cleveland, Ohio
Strong, M. R....Passaic, N. J.
Sutermeister, A. H.,
Albany, N. Y.
Swain, G. F.....Boston, Mass.
Swensson, Emil..Pittsburg, Pa.

Taber, G. A....Brooklyn, N. Y.
Talbot, A. N.....Urbana, Ill.
Thacher, Edwin.New York City
Theban, J. G....New York City
Thompson, B.....Atlanta, Ga.
Thompson, G.....Beaver, Pa.
Thompson, S. E.,
Newton Highlands, Mass.
Thomson, G. H.New York City
Thomson, T. K.New York City
Thornley, J.,
Niagara Falls, N. Y.
Tilden, C. J..Ann Arbor, Mich.
Toensfeldt, H. C.St. Louis, Mo.
Tone, S. L.....Pittsburg, Pa.
Tratman, E. E. R..Chicago, Ill.
Trautwine, J. C., Jr.,
Philadelphia, Pa.
Travell, W. B..New York City
Tribus, L. L....New York City
Tucker, L. W..Cleveland, Ohio

Van Buskirk, C. R.,
Brooklyn, N. Y.
Van Cleve, A. H.,
Niagara Falls, N. Y.
Van Suetendael, A. O.,
Yonkers, N. Y.
Verveer, E. L.,
New Haven, Conn.
Vredenburgh, W., Jr.,
New York City

Waddell, J. A. L.,
Kansas City, Mo.
Walker, J. M. Youngstown, Ohio
Walker, J. W....Pittsburg, Pa.
Warder, J. H.....Chicago, Ill.
Watson, Irvine...Dayton, Ohio
Watson, W. J..Cleveland, Ohio
Waugh, W. H...Pittsburg, Pa.
Wendt, E. F.....Pittsburg, Pa.
West, O. J.....Chicago, Ill.
Whipple, G. C..New York City
White, L.....Brooklyn, N. Y.
White, T. S..Beaver Falls, Pa.
Whited, W.....Pittsburg, Pa.
Wiggin, T. H...Pittsburg, Pa.
Wilcock, F.....New York City
Wilcox, F.....Pittsburg, Pa.
Wilkerson, T. J..Pittsburg, Pa.
Wilkins, W. G...Pittsburg, Pa.
Williams, G. S.,
Ann Arbor, Mich.
Wisner, G. Y....Detroit, Mich.
Witmer, J. F.....Buffalo, N. Y.
Wolverton, I. M.,
Mt. Vernon, Ohio
Worcester, J. R..Boston, Mass.
Wrentmore, C. G.,
Ann Arbor, Mich.
Wright, C. H..Cleveland, Ohio

Yates, P. K....Cleveland, Ohio
Young, C. G...New York City

Zeller, A. H.....St. Louis, Mo.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, September 6th, 1905.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, by Edwin H. Warner, M. Am. Soc. C. E., entitled "The Hydraulic Plant of the Puget Sound Power Company," will be presented for discussion.

This paper was printed in *Proceedings* for May, 1905.

Wednesday, September 20th, 1905.—8.30 P. M.—At this meeting a paper entitled "Notes on the Improvement of River and Harbor Outlets in the United States," by D. A. Watt, M. Am. Soc. C. E., will be presented for discussion.

This paper was printed in *Proceedings* for May, 1905.

Wednesday, October 6th, 1905.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and two papers will be presented for discussion, as follows: "Some Specialties of the System for Flushing the New Sewers of the City of Mexico," by Roberto Gayol, M. Am. Soc. C. E., and "The Walworth Sewer, Cleveland, Ohio," by Walter C. Parmley, M. Am. Soc. C. E.

Both these papers are printed in this number of *Proceedings*.

Wednesday, October 20th, 1905.—8.30 P. M.—At this meeting a paper entitled "An Example of the Legitimate Use of Water for Domestic Purposes," by K. F. Cooper, Jun. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings*.

PRIVILEGES OF LOCAL SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

The Boston Society of Civil Engineers will welcome any member of the American Society of Civil Engineers at its library and reading room, 715 Tremont Temple, Boston, which is open on week days from 9 A. M. to 5 P. M. Members will also be welcome at the meetings, which are held in the same building, on the evenings of the fourth Wednesday in January, and the third Wednesdays of other months, except July and August.

The rooms of **The St. Louis Engineers' Club** are in the business center of St. Louis, and visiting engineers are cordially invited to use them for mail, telephone service, information, etc.

The courtesies of **The Engineers' Society of Western Pennsylvania** have been extended to members of the American Society of Civil Engineers. The rooms of the Society, 410 Penn Ave., Pittsburg, Pa., are open at all times, and meetings are held as follows, except during July and August. REGULAR SECTION, Third Tuesdays; CHEMICAL SECTION, Thursdays following third Tuesdays; MECHANICAL SECTION, First Tuesdays; STRUCTURAL SECTION, Fourth Tuesdays.

The Western Society of Engineers, Monadnock Block, Chicago, Ill., tenders to members of this Society the use of its rooms and facilities, together with the good offices of its Secretary and of a special committee appointed for that purpose.

The Civil Engineers' Club of Cleveland, Ohio, invites members of this Society to make use of the Club rooms, at any time when in Cleveland. Cards will be furnished on application to the Secretary, Mr. J. C. Beardsley.

The Engineers' Club of Central Pennsylvania has established new quarters at the corner of Second and Walnut Streets, Harrisburg, Pa., and desires to extend the courtesies of the Club to visiting members of the American Society of Civil Engineers.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

THE *TECHNOLEXICON* OF THE SOCIETY OF GERMAN ENGINEERS.

At the request of Dr. Hubert Jansen, Editor-in-Chief of the *Technolexicon* of the Verein Deutscher Ingenieure, the following announcement is made:

"In the compilation of this universal technical dictionary for translation purposes, in English, German and French, commenced in 1901, about two thousand firms and individual collaborators, at home and abroad, are assisting at present.

"Up to June, 1905, 2 700 000 word-cards have been collected. To these will be added the hundred thousands of cards that will result from the working out of the original contributions not yet taken in hand. The contributions have been called in since Easter, 1904, and most of them have already come in (1 480, up to June, 1905).

"The Editor-in-Chief will be pleased to give any further information wanted. Address: Technolexicon, Dr. Hubert Jansen, Berlin (N. W. 7), Dorotheenstrasse 49."

ACCESSIONS TO THE LIBRARY.

From May 10th to August 2d, 1905.

DONATIONS.*

PROPERTIES OF STEEL SECTIONS.

A Reference Book for Structural Engineers and Architects. By John C. Sample. Cloth, 9 x 6 in., illus., 7 + 121 pp. New York, McGraw Publishing Company, 1905. $3.

This work includes tables of moments of inertia and radii of gyration of built sections, examples of sections selected from monumental structures, unit stresses, safe loads for columns, plate-girder design, design in timber, etc., with only sufficient text to explain their application. It is hoped the designer will be able to select directly from the tables here given such sections as will meet his special requirements, thus saving the energy ordinarily spent in preliminary figuring for more important parts of design. It has not been considered to be within the scope of the book to treat the subjects involved from a theoretical standpoint. It is stated that all values have been calculated and checked independently. The author has aimed to confine himself to those sections which are necessary to good design and such shapes as are carried in stock by most large structural steel plants, it being the desire to avoid unnecessary refinements. Common usage will account for the appearance of some of these sections. Properties of patented sections are omitted. Where possible all controverted points have been avoided. There is a diversity of practice as to how much the back to back of angles should exceed the width of the plate for plate girders and columns, the practice being about equally divided between ¼ and ½ in. The author has used ¼ in. for all sections with less than 42-in. plates, since this is on the safe side for those using ½ in. It is stated that with the exception of the chapter giving safe loads of columns, the material is general and capable of being applied to any specification. The book contains a table of contents, but no index.

SKETCH PORTFOLIO OF RAILROAD STATIONS.

From Original Designs. By Bradford L. Gilbert. Cloth, 13 x 10, illus., unpaged. New York, Railroad Gazette, 1904. $3.25. (Donated by the author and publisher.)

The preface states that this volume is a collection of designs and drawings in black and white, illustrating the evolution in railroad station architecture. The majority of the drawings are reproduced necessarily on a greatly reduced scale. No attempt has been made to provide a text-book, the object being to indicate briefly, though comprehensively, what has been accomplished in the beautifying of railroad stations, and to encourage further progress in this direction. The first edition of this work was issued in 1895. The present edition also contains a supplement, giving recent examples of railroad station architecture, particularly of cement construction, bringing the work down to the present day.

LES MINES ET LA METALLURGIE,

À l'Exposition du Nord de la France (Arras 1904). Par Ed. Lozé. Paper, 13 x 9 in., illus., 15 + 400 pp. Paris, Vve. Ch. Dunod, 1905. 18 francs.

In this work the author aims to give an account of this exposition in that which concerns mines, principally the coal mines of Pas-de-Calais, the metallurgy of the region, the machinery, materials and products of these great industries, and the mineral wealth of Algeria. An attempt is made to show the progress realized and at the same time give more especial attention to the preparation, processes and results. Most of the exhibits, especially those of the great coal mining companies, metallurgists and of the manufacturing houses, their work, inventions and adaptations, show their financial, technical, social and economic power. The question of transportation, particularly important for industries with heavy and cumbersome products, has been developed. The author intended to observe a methodical classification in the contents of his work, but, as this of necessity is not always possible, he has prepared an alphabetical index of seven and a half pages.

*Unless otherwise specified, books in this list have been donated by the publishers.

JAHRBUCH FÜR DAS EISENHÜTTENWESEN; III. JAHRGANG.

Ergänzung zu "Stahl und Eizen." Ein Bericht über die Fortschritte auf allen Gebieten des Eisenhüttenwesens im Jahre 1902. Im Auftrage des Vereins deutscher Eisenhüttenleute bearbeitet von Otto Vogel. Cloth, 10 x 6 in., illus., 16 + 465 pp. Düsseldorf, A. Bagel, 1905. 10 marks.

This work is a supplement to *Stahl und Eisen,* and is a review of German and foreign periodical literature on the iron-works industry of the year 1902. In preparing this volume, the editor has reviewed not less than 134 technical, scientific periodicals, the greater part of them being in a foreign tongue. The number of entries, being 1 800 in the first volume and 2 000 in the second, have increased to 2 600 in the third volume. Besides simply giving the source of the articles, illustrated abstracts are given for those of particular importance. The bibliographies are arranged by subject; and there are author and subject indexes, both included in forty pages.

OSBORN'S TABLES OF MOMENTS OF INERTIA;

And Squares of Radii of Gyration, to which have been added Tables of the Working Strengths of Steel Columns, the Working Strengths of Timber Beams and Columns, Standard Loads and Unit Stresses and Constants for Determining Stresses in Swing Bridges. Fifth Edition, revised. Leather, 7 x 5 in., illus., 184 pp. Cleveland, Osborn Engineering Co., 1905. $3.

The preface states, that, since the publication of the fourth edition in 1894, the various mills have adopted uniform standards of shapes which nearly all varied somewhat from those used in the tables. This considerably decreased the usefulness of the tables as they then existed. In the present edition the tables of moments of inertia and squares of radii of gyration have all been completely refigured, using the present standard mill sections and shapes, and combining them in accordance with present designing practice. The tables of $\frac{L^2}{r^2}$, square root, swing bridges, rivets, web plates and timber beams, have all been preserved; some of the matter now obsolete has been omitted and in its place there have been included tables of the safe working strengths of soft steel and medium steel columns, of standard loads and unit stresses for bridges, of timber columns and of bridge weights. There have also been included a few pages of historical and other statistics concerning the bridges of the world.

LES FOURS ÉLECTRIQUES;

Et ses Applications Industriels. Par Jean Escard, Préface de Henri Moissan. Paper, 10 x 6 in., illus., 13 + 535 pp. Paris, Vve. Ch. Dunod. 18 francs.

The author proposes to put into the hands of engineers and manufacturers a treatise giving complete information on thermo-electric manufactures. It is stated that the use of the electric furnace, capable of a temperature of from 2 000 to 3 500°, for a long time confined to laboratory researches, has now been extended to factories. The author is attempting to show in a manner as accurate and technical as possible the advantages that the electric furnace presents over the processes generally used in metallurgy. He has treated in detail electro-siderurgy or thermo-electric manufacture of iron and steel, which, it is stated, tends to be substituted to-day for the ordinary blast furnace and converter. The Keller, Gin and Stassano processes are considered. The thermo-electric products are also studied from the beginning. Glass, carborundum, phosphorus, arsenic, baryte, etc., are among the products prepared to-day by the electric furnace. A number of recent industries are described, and the question of the use of electric energy as a source of heat has been reviewed. There is an alphabetical index of seven pages.

GAS-ENGINES AND PRODUCER-GAS PLANTS;

A Practical Treatise Setting Forth the Principles of Gas-Engines and Producer Design, the Selection and Installation of an Engine, Conditions of Perfect Operation, Producer-Gas Engines

and their Possibilities, the Care of Gas-Engines and Producer-Gas Plants, with a Chapter on Volatile Hydrocarbon and Oil Engines. By R. E. Mathot; translated from the original French manuscript by Waldemar B. Kaempffert. Cloth, 9 x 6 in., illus., 314 pp. New York, The Norman W. Henley Publishing Company, 1905. $2.50.

It is the purpose of this work, according to the preface, to indicate the more elementary precautions to be taken in the care of an engine operating under normal conditions, and to explain how repairs should be made to remedy the injuries caused by accidents. Engines which are of less than 200 horse-power and which are widely used in a small way are studied. The relative cost of different kinds of motive power is considered, the net cost per horse-power is examined in each case in order to show which is the least expensive method of generating power in ordinary circumstances, disregarding special reasons which may favor one or the other. There is an index of about nine pages.

THE MODERN ASPHALT PAVEMENT.

By Clifford Richardson, Assoc. Am. Soc. C. E. Cloth, 9 x 6 in., illus., 7 + 580 pp. New York, John Wiley & Sons, 1905. (Donated by the author.) $3.

The preface states that the present work, being designed for a rather wide class of readers, necessarily includes a large collection of data in regard to the chemistry of asphalt and the technology of the industry which is of interest only to civil engineers, asphalt experts and those who have made a special study of the subject. The general reader is recommended to omit the chapters containing these data or to confine himself to the résumés of them which are presented at the end of each. It is stated that the property holder and the taxpayer will find conclusions that will prove of interest to them relating to the construction of pavements and the causes of their deterioration. The relative merits of various asphalts for paving purposes are given in a compact form, and the importance of the action of water on asphalt is considered. The résumé at the end of each chapter is intended to furnish the reader at a glance with an opportunity of determining whether the details in that chapter appeal to his interest and intelligence. There is an index of seventeen pages.

SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION.

Proceedings of the Twelfth Annual Meeting held in St. Louis, Mo., September 1-3, 1904. Edited by C. F. Allen, F. W. McNair, M. S. Ketchum. Cloth, 9 x 6 in., 40 + 253 pp. New York, Engineering News Publishing Co., 1905. $2.50.

This work contains the constitution and list of members and addresses on, The Outlook for Engineering Education, by C. F. Allen; A Practical Method of Instructing Engineering Students in the Biography and History of their Profession, by Robert Fletcher; A Business Proposition, by J. A. L. Waddell; The Crowding of the Curriculum, by A. C. Humphreys; The Extension of Engineering Investigational Work by Engineering Schools, by A. N. Talbot; Industrial Catalogue Library, by J. G. D. Mack; Report of a Committee on Requirements for Graduation, by W. G. Raymond; Field Work in Civil Engineering at Iowa State College, by Anson Marston; The Naval Academy as a Technical School, by I. N. Hollis; Report of the Committee on Technical Books for Libraries, by C. F. Burgess; The Preparation of Engineering Text Books, by E. H. Powell; Absolute and Gravitational Systems of Units, by E. R. Mauer; On Teaching Calculus to Engineering Students, by B. F. Groat; Work of the Dean of the Faculty of the Massachusetts Institute of Technology, by A. E. Burton. There is an index of three and one-half pages.

ELECTRIC RAILWAYS.

Theoretically and Practically Treated. By Sydney W. Ashe and J. D. Keiley. Cloth, 8 x 6 in., illus., 285 pp. New York, D. Van Nostrand Company; London, Archibald Constable and Company, Ltd., 1905. $2.50.

It has been the aim of the authors to treat the subject from a theoretical as well as from a practical standpoint, so as to produce a book which could be used as a text in technical institutions as well as a general engineering refer-

ence book for those interested in railway problems. With this object in view, the use of calculus has been avoided, the differential coefficient being used but occasionally. Where calculus methods appear, the same formulas are expressed in addition in algebraic form. Realizing the extent of the traction field and the great demand for information concerning rolling stock, the volume has been restricted to that part of the subject. There is an index of five pages.

EXPERIMENTAL RESEARCHES ON THE FLOW OF STEAM THROUGH NOZZLES AND ORIFICES.

By A. Rateau; authorized translation by H. Boyd Brydon. Cloth, 8 x 5 in., illus., 4 + 76 pp. New York, D. Van Nostrand Company, 1905. $1.50 net.

The preface states that the rapid advance in the development of the steam-turbine, within the last few years, has necessitated the re-investigation of steam from the point of view of velocity instead of pressure, of kinetic energy instead of potential, of the friction of rapidly moving bodies against a vapor instead of a lubricated surface, of the balancing of parts so that they shall revolve about their center of gravity, and of numerous other questions which are but beginning to make themselves felt. The available data are few, and practically all the information is scattered widely through the pages of French or German scientific magazines. Of all these, the fundamental problem is the proportioning of the nozzles or passages which shall permit the steam to transform its pressure into *vis viva*. This translation has been made of the experiments undertaken by Professor Rateau on this feature of steam-turbine design for those who have neither the time nor the inclination to study them in the original. The appendix contains a bibliography for those wishing to make a further study of this subject.

DIFFERENTIAL EQUATIONS:

A Short Course for Engineering Students. By James E. Boyd. Cloth, 8 x 5 in., 6 + 54 pp. Columbus, Published by the Author, 1905. 60 cents.

It is stated in the preface that the purpose of this book is to present those portions of differential equations which are most used by engineers. It was written with reference to the needs of two classes of students; those who take the subject as a preparation for the study of mechanics, and students in electrical engineering who are already well grounded in the physical ideas involved in the electrical problems. The former take the first three chapters, omitting the electrical problems; the latter complete the book. The examples were prepared with the double purpose of illustrating the text, and of affording a review of some of the more important operations of the calculus. Answers are given and stress is laid on the importance of verifying results. In the problems, the physical meaning and use of the arbitrary constants are kept prominent.

THE AUTOMOBILE POCKETBOOK;

A Compendium of the Gasoline Automobile. By E. W. Roberts. Leather, 5 x 3 in., 8 + 329 pp. Cincinnati, The Gas Engine Publishing Co., 1905. $1.50.

The author's purpose in writing this book has been to place before the designer and the operator, in a brief manner, a few general notes on the design and the operation of the gasoline automobile. It is his desire that this work shall be a standard of reference for those interested in the subject. It is stated that a number of points regarding automobile construction have been necessarily omitted because it would make the book too bulky as a pocketbook. There is an index of almost ten pages.

THE CEMENT-WORKER'S HAND-BOOK,

Covering more than Fifty Most Important Subjects on Cement and its Uses in Construction. Compiled by W. H. Baker. Cloth, 6 x 4 in., 86 pp. Published by the Author. 50 cents.

The preface states that this work contains the results of twenty years of experience, and is written for the workman. The author aims to make this little book so simple, so clear and fundamental, that the farmer and others not

familiar with cement may do much of their own work, confident of success, while the more difficult work in this line must of necessity go to the regular cement worker or mason. The contents are: Introduction to Commercial Hydraulic Cement; Mortars; Concretes; Cast Masonry, Stationary and Portable; Practical Notes on Cement Work.

JAMES WATT.

By Andrew Carnegie. Cloth, 9 x 6 in., 241 pp. New York, Doubleday, Page & Company, 1905. $1.40 net.

This volume contains, in addition to an appreciative biography of the great inventor, a large amount of collateral information, relating to the literature, education, industrial conditions, etc., of the Scotch people. The narrative is told under the following chapter headings: Childhood and Youth; Glasgow to London—Return to Glasgow; Captured by Steam; Partnership with Roebuck; Boulton Partnership; Removal to Birmingham; Second Patent; The Record of the Steam Engine; Watt in Old Age; Watt, the Inventor and Discoverer; Watt, the Man.

A HAND-BOOK FOR CEMENT-USERS.

Edited by Charles Carroll Brown, M. Am. Soc. C. E. Third edition, revised and enlarged. Cloth, 9 x 5 in., illus., 369 pp. Municipal Engineering Company, Indianapolis, 1905. $3.

The preface states that in this edition portions of the book are rewritten and a full statement is added of the use of concrete in buildings, in solid and hollow concrete walls, in hollow cement building blocks, in floors and in various forms of reinforced concrete construction. The latter treatment is extended to bridges, arches, culverts, etc., in amplification of and addition to what has appeared in early editions. The introductory chapter is revised in view of the great advances in the cement trade and in the uses to which cement is put. In the chapters on testing cement, on specifications for cement and for its use, on the uses of cement and on testing laboratories, additions have been made to cover the latest developments in the technical societies, in the use of cement in public and private work, large and small, and the best new things in specifications and descriptions of method. A new chapter is inserted on the manufacture of cement, with descriptions of the various methods and machinery in use in this country. The general features of each chapter, with the above exceptions, are the same as in the first edition. There is an index of about six pages.

LECTURE NOTES ON SOME BUSINESS FEATURES OF ENGINEERING PRACTICE.

By Alex. C. Humphreys, M. Am. Soc. C. E. Cloth, 9 x 6 in., 187 pp. Stevens Institute of Technology, 1905. $1. (Donated by the Author.)

These notes are prepared for the use of students outside of the class-room in preparation for examinations. The author hopes to be able to develop from these and supplementary notes a text book on the business features of engineering practice, based upon his experiences in the fields of Engineering and Business as to the matter, and upon his experiences in the class-room as to the most efficient methods, to be used in presenting this matter to engineer-students. The contents are: The Point of View; Notes on Contracts; General Notes; Accounting; Repairs and Depreciation; Accounting as Applied to Depreciation; Systems of Classification—"Taxes"; Analysis of a Balance Sheet; Analysis of Data; Estimates and Specifications.

DIRECTORY OF AMERICAN CEMENT INDUSTRIES.

Third Edition, Revised and Enlarged. Cloth, 9 x 5 in., 735 pp. Indianapolis, Municipal Engineering Company, 1904. $5.

In the introduction to this edition we are informed that the expansion in the cement industry has necessitated a new edition of this work. The pressure upon the pages has made advisable the separation of the two parts of the book so that now the "Handbook for Cement Users" is published separately from the "Directory of American Cement Industries."

The contents are: Introduction; Explanation of Reference Notes; Descrip-

tions of Works; Cement Companies' Names Not Now in Use; American Cement Manufacturers; Directory of Cement Brands; Directory of Sales Agents; Geographical List of Cement Manufacturers; Foreign Cement Trade; Dealers in Cement; Contractors and Other Users of Cement; Artificial Stone, Hollow Concrete Blocks, etc.; Engineers and Other Supervisors of the Use of Cement; Cement Tests and Analyses, Engineers Designing Cement Plants; Machinery and Supplies for Cement Plants, Machinery and Tools for Cement Users; Plaster Manufacturers; Lime Manufacturers; Dealers in Lime and Plaster; Map Showing Location of Cement Plants.

CIVIL ENGINEERING.

A Text-book for a Short Course. By G. J. Fiebeger, M. Am. Soc. C. E. First edition. Cloth, 9 x 6, illus., 12 + 573 pp. New York, John Wiley & Sons, 1905. $5.

The preface states that this text-book is designed primarily for the cadets of the U. S. Military Academy. The Academic Board of the Military Academy has, since its origin, provided for a short course in civil engineering. The aim of the course is to teach the cadets the general principles governing the construction of engineering structures without any attempt to make them specialists. In this course it has been necessary to avoid elaborate details and also to omit some of the branches of what is now classed as civil engineering in contradistinction to electrical, mining and mechanical engineering. The chapter headings are: Classification of Stresses and Longitudinal Stress; Shearing and Torsional Stress; Flexure or Bending; Beams Fixed at the Ends and Curve of Mean Fiber; Continuous Beams, Horizontal Shear, Combined Stresses, and Eccentric Loading; Moving or Live Loads on a Beam; Columns; Rivets and Pins; Solid-Built Beams, I Beams, and Plate Girders; Determination of Stresses by Analytic Methods in Simple Trusses Resting on End Supports and Carrying Uniform Dead Loads; Effect of Moving Loads upon Trusses with Parallel Chords; Graphic Method of Determining the Stresses in a Truss; The Graphic Method Applied to Parallel Forces; Solution of Trusses Continued; Masonry Dams and Retaining-Walls; Masonry Arches; The Pressure and Flow of Water; Timber; Metals; Natural and Artificial Stone; Masonry; Foundations; Bridges; Trussed Roofs and Floors; Highways; Water Supply; Sewerage. There is an index of nine pages.

THE SANTIATION OF A COUNTRY HOUSE.

By Harvey B. Bashore. First edition. Cloth, 8 x 5, pl., 6 + 103 pp. New York, John Wiley & Sons, 1905. $1.

The author's aim in this work is to point out the way "to make the country as healthy as the city," and in this little work he has endeavored to lay down directions that will ensure the sanitary construction and maintenance of small country houses and camps. The chapter headings are: The Location; The House; The Water Supply; The Disposal of Waste; The Surroundings; The Summer Camp.

THE COMMERCIAL MANAGEMENT OF ENGINEERING WORKS.

By Francis G. Burton. Second Edition. Revised and Greatly Enlarged. Cloth, 9 x 6 in., 15 + 432 pp. Manchester: The Scientific Publishing Co., 1905. 12 shillings, 6 pence.

In preparing a second edition of this work the author has endeavored to give proper consideration to the many discussions and treatises which have been published during the last few years on the subject of "Engineering Management" and "Engineering Cost Accounts."

The Companies Act of 1900 is given in full. Additional illustrations of estimates have been introduced and a new chapter on cost accounts has been added.

The contents are: The Directors and Secretary; The Auditor; The General Manager; The Draughtsman and Subordinate Officials—Requisitions for Materials; Purchases and Inspection of Materials; Receipt of Materials and Passing of Invoices, etc.; Cost Accounts—Recapitulation of Arrangement for Purchases; Sales Department; The Correspondent and his Duties; The Preparation of Estimates; Tenders sent out—Orders Received; Drawing Office Orders for Work—Stock Orders; Alternative Plan of Register—Alteration of Drawings and Patterns—Filing Drawings; The Works Manager and His Duties—Dealings with Workpeople; Wages Accounts—Issue of Materials—Stores Books and Returns; Cost Accounts—Depreciation—Interest—Establishment

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PRACTICAL ALTERNATING CURRENTS AND ALTERNATING CURRENT TESTING.

By Charles F. Smith, Assoc. M. Inst. C. E. Cloth, 9 x 6 in., illus., 457 pp. Manchester, The Scientific Publishing Co. 6 shillings net.

This work is a companion volume to the author's "Practical Testing of Dynamos and Motors." The preface states that it deals in an elementary and practical manner with the principles of alternating currents and alternating-current machinery. It is hoped that it may prove of special use to students in technical schools and colleges in connection with their laboratory work and to young engineers engaged in handling or testing alternating-current machinery. The chapter headings are: Alternating Electromotive Force and Current; Impedance; Power and Power-Factor; Virtual Value of an Alternating Current; Effect of Capacity; The Transformer; Alternators; Synchronous Motors; The Polyphase Circuit; The Rotary Converter; The Induction Motor; The Analysis of Alternator Curves. There is a double column index of five pages.

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DEATHS.

Baier, Julius. Elected Junior, September 7th, 1887; Associate Member, June 1st, 1892; Member, February 6th, 1901; died May 8th, 1905.

Cartwright, Robert. Elected Member, July 10th, 1872; died June 4th, 1905.

Haines, Frank March. Elected Member, March 1st, 1905; died June 1st, 1905.

Morison, William Smith. Elected Associate Member, April 6th, 1904; died May 1st, 1905.

Myers, Edmund Trowbridge Dana. Elected Member, May 2d, 1888; died May 12th, 1905.

Walker, George Clark. Elected Fellow, February 6th, 1873; died April 12th, 1905.

Woollard, George Clifton. Elected Junior, April 3d, 1900; died June 3d, 1905.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(May 7th, 1905, to August 3d, 1905.)

NOTE.—*This list is published for the purpose of placing before the members of the Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal,* Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings,* Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal,* Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal,* Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions,* Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly,* Columbia Univ., New York City, 50c.
(7) *Technology Quarterly,* Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator,* Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine,* New York City, 25c.
(10) *Cassier's Magazine,* New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News,* New York City, 15c.
(14) *The Engineering Record,* New York City, 12c.
(15) *Railroad Gazette,* New York City, 10c.
(16) *Engineering and Mining Journal,* New York City, 15c.
(17) *Street Railway Journal,* New York City. Issues for first Saturday of each month 20c., other issues 10c.
(18) *Railway and Engineering Review,* Chicago, Ill., 10c.
(19) *Scientific American Supplement,* New York City, 10c.
(20) *Iron Age,* New York City, 10c.
(21) *Railway Engineer,* London, England, 25c.
(22) *Iron and Coal Trades Review,* London, England, 25c.
(23) *Bulletin,* American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal,* New York City, 10c.
(25) *American Engineer,* New York City, 20c.
(26) *Electrical Review,* London, England.
(27) *Electrical World and Engineer,* New York City, 10c.
(28) *Journal,* New England Water-Works Assoc., Boston, $1.
(29) *Journal,* Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique,* Brussels, Belgium.
(31) *Annales de l'Assoc. des Ing. Sortis des Ecoles Speciales de Gand.* Brussels, Belgium.
(32) *Memoires et Compte Rendu des Travaux,* Soc. Ing. Civ. de France, Paris, France.
(33) *Le Genie Civil,* Paris, France.
(34) *Portefouille Economique des Machines,* Paris, France.
(35) *Nouvelles Annales de la Construction,* Paris, France.
(36) *La Revue Technique,* Paris, France.
(37) *Review de Mecanique,* Paris, France.
(38) *Revue Generale des Chemins de Fer et des Tramways,* Paris, France.
(39) *Railway Master Mechanic,* Chicago, Ill., 10c.
(40) *Railway Age,* Chicago, Ill., 10c.
(41) *Modern Machinery,* Chicago, Ill., 10c.
(42) *Transactions,* Am. Inst. Elect. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussees,* Paris, France.
(44) *Journal,* Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals,* Scranton, Pa., 20c.
(46) *Scientific American,* New York City, 8c.
(47) *Mechanical Engineer,* Manchester, England.
(48) *Zeitschrift,* Verein Deutscher Ingenieure, Berlin, Germany.
(49) *Zeitschrift für Bauwesen,* Berlin, Germany.
(50) *Stahl und Eisen,* Düsseldorf, Germany.
(51) *Deutsche Bauzeitung,* Berlin, Germany.
(52) *Rigasche Industrie-Zeitung,* Riga, Russia.
(53) *Zeitschrift,* Oesterreichischer Ingenieur und Architekten Verein, Vienna, Austria.

(54) *Transactions,* Am. Soc. C. E., New York City, $5.
(55) *Transactions,* Am. Soc. M. E., New York City, $10.
(56) *Transactions,* Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian,* London, England.
(58) *Proccedings,* Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions,* Mining Inst. of Scotland, London and Newcastle-upon-Tyne, England.
(60) *Municipal Engineering,* Indianapolis, Ind., 25c.
(61) *Proceedings,* Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World,* 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings,* Inst. C. E. London, England.
(64) *Power,* New York City, 20c.
(65) *Official Proceedings,* New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting,* London, England, 15c.
(67) *Cement and Engineering News,* Chicago, Ill., 25c.
(68) *Mining Journal,* London, England.
(70) *Engineering Review,* New York City, 10c.
(71) *Journal,* Iron and Steel Inst., London, England.
(72) *Street Railway Review,* Chicago, 30c.
(73) *Electrician,* London, England, 18c.
(74) *Transactions,* Inst. of Min. and Metal., London, England.
(75) *Proceedings,* Inst. of Mech. Engrs., London, England.
(76) *Brick,* Chicago, 10c.
(77) *Journal.* Inst. Elec. Engrs., London, England.
(78) *Beton und Eisen,* Vienna, Austria.
(79) *Forscherarbeiten,* Vienna, Austria.
(80) *Tonindustrie-Zeitung,* Berlin, Germany.
(81) *Zeitschrift fur Architektur und Ingenieurwesen,* Wiesbaden, Germany.
(82) *Dinglers Polytechnisches Journal,* Berlin, Germany.
(83) *Progressive Age,* New York City, 15c.

LIST OF ARTICLES.

Bridge.

Concrete-Steel Bridges.* Fritz von Emperger. (54) Vol. 54, Pt. E.
Some Primary Truss Principles. Myron S. Falk. (6) Apr.
Transporter Bridge over the Mersey.* (12) May 5; (11) June 2; (11) June 16; (47) June 3.
The Reconstruction of the Point Bridge, Pittsburg.* (14) Serial beginning May 6.
The Pine Creek Long-Span, Plate-Girder Bridge.* (14) May 6.
Standard Bridge Plans and Specifications of the Harriman Lines.* (18) May 6; (15) July 28.
Reinforced Concrete Arch Bridge at Yorktown, Ind.* (13) May 11.
The Mississippi River Cantilever Bridge at Thebes, Ill.* (13) May 11; (15) May 26.
Scherzer Lift Bridge over the River Swale.* (11) Serial beginning May 12.
Details of Blackwells Island Bridge Superstructure. (14) Serial beginning May 20.
The Oak Lane Bridge, Reading Ry., Philadelphia. (14) May 20.
The Erection of the Short Line R. R. Bridge at Minneapolis.* (14) May 20.
Substructure and Falsework Construction for the Gilbertsville Bridge.* (14) May 20.
Design and Construction of High Bridge Piers of Reinforced Concrete.* Wm. M. Torrance. (13) May 25.
Ballasted Bridge Floors.* A. F. Robinson. (4) June.
The Condition and Defects of Early Wrought Iron Bridges.* (21) June.
Wreck of the Portage Canal Draw-Bridge.* (13) June 1.
The Connecticut Avenue Concrete Arch Bridge at Washington, D. C.* (13) June 1; (14) July 8.
Erection of the Walnut Street Long-Span Girder Bridge, Philadelphia.* (14) June 3.
The Cantilever Erection of the St. Joseph Drawbridge.* (14) June 3.
Reconstruction of the Horse Run Viaduct: Cincinnati Southern Railway.* (13) June 8.
The Fades Viaduct over the Sioule River near Vauriat, France.* (13) June 8.
Erection of the Channel Span of the Benwood Bridge.* (14) June 10.
The New Westminster Bridge over the Fraser River, British Columbia.* (13) Serial beginning June 15.
The St. Louis Southwestern Bridge at Shreveport.* (15) June 16.
Replacing a Howe Truss Span with Plate Girders.* (14) June 17.
Grand River Reinforced Concrete Bridge, Grand Rapids, Mich. (14) June 17.
Concrete Bridge over the Big Muddy River, Illinois Central Railroad.* (19) June 17.

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The Highway Bridge over the Wabash River at Terre Haute.* (14) June 17; (15) July 7.
Double Lift Bridge: Central of New Jersey.* (40) June 23.
The Double-Track Austerlitz Bridge, Paris.* (14) June 24.
Bridge over the River Zambesi at Victoria Falls, Rhodesia.* (11) Serial beginning July 7.
A Reinforced Concrete Bridge in Manila.* (14) July 8.
The Tennessee River Bridge of the Illinois Central.* H. W. Parkhurst. (15) July 14.
Reinforced Concrete Bridge Floors, Culverts and Abutments, Wabash R. R.* (18) July 15.
Cantilever Erection of Simple Riveted Railroad Spans.* (14) July 15.
Three-Hinged Steel Arch Bridge at Exeter, England.* (13) July 20.
Maximum Bending Moments due to Rolling Loads.* (12) July 21.
Cantilever Bridge over the Mississippi River.* (12) Serial beginning July 21.
The Deflection of Continuous Rail-Bearers. Max am Ende, M. Inst. C. E. (11) Serial beginning July 21.
The New Manhattan Terminal for the Brooklyn Bridge.* (15) July 14; (40) July 21.
The Thebes Bridge Superstructure.* (14) July 22.
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The Newark Viaducts of the Lackawanna Railroad. (14) July 22.
Test of Concrete Bridge Floors. (14) July 22.
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Bascule Bridge of the New Orleans Terminal Company.* (15) July 28.
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The Erection of the Great Tonoloway Creek Bridge.* (14) July 29.
Replacing a Four-Track Bridge under Heavy Traffic.* (14) July 29.
The Superstructure of the Manhattan Bridge, New York.* (14) July 29.
Application de la Méthode des Joints Secs a la Construction des Voutes Biaises.* M. Thérel. (43) 1er Trimestre.
Calcul des Ponts en Arc et des Ponts Suspendus.* M. Considère. (43) 1er Trimestre.
Construction de Deux Ponts Suspendus Rigides (Système Gisclard). Maurice Lévy. (43) 1er Trimestre.
Application du Système de la Suspension aux Ponts de Grande Ouverture pour Voies Ferrées. M. Arnodin. (43) 1er Trimestre.
Entretien des Chaussées Empierrées: Les Rechargements Généraux Cylindrés. L. Cendre. (36) Apr. 25.
Viaduc d'Austerlitz sur la Seine pour la Chemin der Fer Métropolitain de Paris.* A. Dumas. (33) Apr. 29.
Le Pont sur le Zambèze.* (33) June 3.
Les Ponts Métalliques, Système Vierendeel: Pont a Arcades d'Avelghem (Belgique).* A. Morizot. (33) June 17.
Appontement Métallique de Lome (Afrique Occidentale).* (33) July 15.
Genauere Behandlung Statisch Unbestimmter Parallelträger und Vergleich mit der Näherungsrechnung. Friedrich Hartmann. (53) Apr. 28.
Die Hansabrücke zu Stettin.* (48) Apr. 29.
Die Troitzky-Brücke über die Newa in St. Petersburg.* G. Kriwoschein. (51) May 17.
Die Neuen Nilbrücken in Kairo.* Josef Rossbändler. (53) May 26.
Untersuchung eines Flachen Bogens mit Festen Kämpfergelenken Beansprucht von Horizontalen Kräften.* G. Ramisch. (82) Serial beginning June 17.
Gewölbte Brücke in Stampfbeton mit Betongelenken über die Lenne in Halden i. W.* (51) June 21.
Ein Neuer Biegungszeichner und die damit Gemessenen Stosswirkungen von Strassenfahrzengen auf Brückenträger.* Osske. (78) Serial beginning July.
Die Treskow-Brücke zu Oberschöneweide bei Berlin.* Karl Bernhard. (48) Serial beginning July 15.

Electrical.

Operations of the Hudson River Water-Power Company.* C. E. Parsons. (56) Vol. 34.
Electrical Power-Generating Stations and Transmission.* L. B. Stillwell, M. Am. Soc. C. E. (54) Vol. 54, Pt. D.
On Shunt Resistances and Temperature Compensation for Ammeters.* Albert Campbell. (77) Vol. 35.
The Dissymmetry of a Three-Phase System. Allan B. Field. (77) Vol. 35.
The Alternating-Current Series Motor.* F. Creedy. (77) Vol. 35.
Earthing.* W. W. Lackie. (77) Vol. 35.
Notes on Some Effects in Three-Phase Working.* W. M. Thornton. (77) Vol. 35.
Distribution of Electrical Energy.* John Francis Cleverton Snell, M. Inst. C. E. (63) Vol. 159.
Tests of Steel for Electric Conductivity, with Special Reference to Conductor Rails.* J. A. Capp. (56) Vol. 34.

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Protection of Cables from Arcs Due to the Failure of Adjacent Cables. W. G. Carlton. (42) May, 1904.
Synchronous Motors for Regulation of Power-Factor and Line Pressure. B. G. Lamme. (42) May, 1904.
Long Spans for Transmission Lines.* F. O. Blackwell. (42) May, 1904.
Conditions for Continuous Service over Lines Operated in Parallel.* M. H. Gerry, Jr. (42) May, 1904.
The Use of Ground-Shields in Transformers. J. S. Peck. (42) May, 1904.
The Protection of High-Pressure Transmission Lines from Static Discharges. H. C. Wirt. (42) May, 1904.
Acyclic (Homopolar) Dynamos.* J. E. Noeggerath. (42) Jan.
Modern Central Station Design as Exemplified by the New Turbo-Generator Station of the Edison Electric Illuminating Company of Boston.* I. E. Moultrop. (42) Jan.
Relation of Power Capacity to Current Capacity in Alternators.* A. Saunders Morris. (8) Apr.
Some Notes on Polyphase Metering.* J. D. Nies. (42) Apr.
Notes on the Use of Instruments on Switchboards. F. P. Cox. (42) Apr.
The Oscillograph and Its Uses.* Lewis T. Robinson. (42) Apr.
Maintenance of Meters. W. J. Mowbray. (42) Apr.
Electrical Repairs at Sea.* (26) Apr. 28.
Considerations Relating to the Design of the Armature Slot Insulation in High Voltage Alternating Current Generators.* H. M. Hobart. (26) Serial beginning Apr. 28.
Some Notes on the Efficiency of Steam Plant (in electricity works). Walter A. Vignoles. (73) Apr. 28.
Heat Conduction and Radiation of Insulating Varnishes. John C. Dolph. (From the *Electrical Review* of New York.) (73) Apr. 28.
Time-Limit Relays.* George F. Chellis. (42) May.
Duplication of Electrical Apparatus to Secure Reliability of Service. H. W. Buck. (42) May.
Limits of Injurious Sparking in Direct-Current Commutation. Thorburn Reid. (42) May.
Underground and Submarine Conduits for Electric Wires.* D. A. Harrington. (Paper read before the Boston Soc. Civ. Engrs.) (1) May.
The Value of Overhead Mains for Electric Distribution in the United Kingdom. G. L. Addenbrooke. (77) May.
Setting Type by Telegraph.* Donald Murray. (77) May.
Report on Temperature Experiments Carried Out at the National Physical Laboratory.* E. H. Rayner. (77) May.
Temperature Curves and the Rating of Electrical Machinery.* Rud. Goldschmidt. (77) May.
Street Lighting by Electric Arc Lamps.* H. B. Maxwell. (77) May.
The Electrical Operation of Textile Factories.* H. W. Wilson. (77) May.
Gas-Driven Electrical Power Station at Bridgewater, Great Britain.* I. William Chubb. (64) May.
Installing Electrical Machinery.* Norman G. Meade. (64) May.
The Efficiency and Practical Importance of Common Sources of Light.* W. Wedding. (Abstract tr. from *Journal fur Gasbeleuchtung.*) (66) Serial beginning May 2.
Harmonic Analysis Reduced to Simplicity. Silvanus P. Thompson. (73) May 5.
Notes on the Effect of Electric Oscillations on Magnetism. L. H. Walter. (73) May 5.
German Regulations for the Control of Spark Telegraphy. (73) May 5.
Electric Lighting and Railway Construction in the Philippines.* (27) May 6.
A Convenient Form of Oscillograph.* F. A. Laws. (27) May 6.
Electricity in Textile Mills. (14) May 6.
New Power Station at Manchester, England.* (17) May 6.
A New Battery Switch.* C. Liebenow. (Abstract of Paper read before the Elektrotechnisher Verein.) (26) May 12.
The General Electric Co.'s Telephone and Bell Factory.* (73) Serial beginning May 12.
The Mercury Arc.* (27) May 13.
Lightning Protection for High-Voltage Circuits. (27) May 13.
Underground Electric Conduit System in New Orleans.* (27) May 13.
Calculation of Pull Due to Solenoids.* Charles R. Underhill. (27) May 13.
The Electric Lighting Situation in Paris. (27) Serial beginning May 13.
The Analysis of Alternator Curves. Charles F. Smith, A. M. I. C. E. (47) Serial beginning May 13.
The Curtis Turbo-Generator.* (73) May 19.
Hydraulic Station, La Goule, Switzerland.* F. M. Bryan. (27) May 20.
The Law of the Plunger Electromagnet.* Charles R. Underhill. (27) May 20.
Meter Testing for Small Stations.* A. E. Walden. (27) May 20.
The Massie Wireless Telegraph System.* A. Frederick Collins. (19) May 20; (27) July 29.

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Electrical—(Continued).

Modern Lightning Conductors. Killingworth Hedges, M. Inst. C. E. (29) May 26.
The New Works of Messrs. Ernest Scott & Mountain, Limited.* (22) May 26; (26) May 26.
A Boston Office Building Electrical Plant.* (27) May 27.
Wireless Telegraphy in Germany. A. Frederick Collins. (27) May 27.
Moore Vacuum Tube Light.* (27) May 27.
Testing Department of the General Electric Company. (27) May 27.
Electrical Equipment of a Railway Shop.* (27) May 27.
Barclay's Printing Telegraph.* (From the *Western Electrician.*) (19) May 27; (15) June 9.
The Electrical Fire Hazard.* Wm. T. Benallack. (4) June.
High Voltage Direct-Current Transmission.* G. W. Worrall. (64) June.
The Erection of a Direct-Current Dynamo.* L. H. Pike. (64) June.
The Design of Induction Motors. With Special Reference to Magnetic Leakage.* Comfort A. Adams. (42) June.
A New Instrument for the Measurement of Alternating Currents.* E. F. Northrup. (42) June.
Limitations in Direct-Current Machine Design.* Sebastian Senstius. (42) June.
Methods of Measurement of High Electrical Pressures.* S. M. Kintner. (42) June.
On the Use of Aluminium for Overhead Power Lines. W. B. Esson. (73) June 2.
The Mercury Arc Lamp and Rectifier. E. Weintraub. (27) June 3; (73) June 23.
A New System of Street Illumination.* Samuel Ferguson. (27) June 3.
Tests of the Tantalum Lamp.* Louis Bell and W. L. Puffer. (27) June 3; (73) June 23.
Central Station Development in Denver. (27) June 3.
Electric Light and Power in Colorado Springs.* (27) June 3.
A Diagram of the Circuits of the Dynamotor.* A. E. Kennelly and S. E. Whiting. (27) June 3.
Some European High-Tension Switchboards.* F. Niethammer. (27) Serial beginning June 3.
Distance Control by Electric Waves. (19) June 3.
Insulating Varnishes as Heat Conductors and Radiators. (17) June 3.
Test of a 5 000-kw. Alternator.* L. L. Gaillard. (Abstract from Elec. Club *Journal.*) (73) June 9.
Electromagnetic Waves.* (11) June 9.
Continuous Current Generators for Johannesburg.* (73) June 9.
A New Ultra-Violet Mercury Lamp. O. Schott. (19) June 10.
The Hydro-Electric Power Station at Ladermier.* S. Herzog. (27) June 10.
Measuring the Slip of Induction Motors.* F. Lawton Stone. (27) June 10.
The Design of Transformers. A. Press. (26) June 16.
Eddy Current Losses in Solid Pole-Pieces. R. Rüdenberg. (Abstract.) (26) June 16.
The Osmium Incandescent Lamp. (26) June 16.
The Mercury Arc.* E. Weintraub. (Abstract of Paper read before the Amer. Electrochemical Soc.) (73) June 16.
Determination of Wattmeter Correcting Factors by Means of the Oscillograph.* Stanley P. Smith. (73) June 16.
Leakage Indicators.* F. Charles Raphael. (73) June 16.
Recent Developments in Wireless Telegraphy.* (19) June 17.
Selection of Transmission Voltages. Alton D. Adams. (46) June 17.
Electrical Engineering at the Kyoto, Japan, Imperial University.* (27) June 17.
External Reactance for Synchronous Converters.* Clarence P. Fowler. (27) June 17.
The Tantalum Incandescent Lamp. Louis Bell. (Paper read before the National Elec. Light Assoc.) (24) June 19; (60) Aug.
Power Distribution in the Clyde Valley.* (22) June 23.
The Clyde Valley Electrical Power System.* (73) June 23; (26) June 23; (12) June 23.
Notes on Iron Loss. F. Lydall. (26) Serial beginning June 23.
The Diversity Factor, and Its Influence on Motor Load Charges. A. M. Taylor. (26) June 23.
Electricity in Brazil. W. Whyte Gailey, A. M. I. E. E. (26) June 23.
An Experimental Study of Electric Waves and Their Applications.* Edouard Branly. (19) June 24.
Niagara Power in Toronto.* (27) June 24.
Booster Field Control. Carl P. Nachod. (27) June 24.
Load Factor: Its Effect upon an Electricity Station. Alexander Sinclair. (Paper read before the Inc. Mun. Elec. Assoc.) (73) June 30.
Street Lighting. E. E. Hoadley. (Paper read before the Inc. Mun. Elec. Assoc.) (73) June 30.
The Starting of Induction Motors.* Frank Lewis. (26) June 30.

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Electrical—(Continued).

An Australian Station Having Compound-Wound Dynamos Paralleled with Accumulators.* E. Kilburn Scott. (26) June 30.
A New Carbon Filament. John W. Howell. (42) July.
Alternate Current Machinery: Induction Alternators. Wm. Stanley and G. Faccioli. (42) July.
Notes on the Power-Factor of the Alternating-Current Arc.* Geo. D. Shepardson. (42) July.
Eddy Currents in Large Slot-Wound Conductors.* A. B. Field. (42) July.
Data Relating to Electric Conductors and Cables.* H. W. Fisher. (42) July.
An Experimental Study of the Rise of Potential on Commercial Transmission Lines Due to Static Disturbances Caused by Switching, Grounding, etc. Percy H. Thomas. (42) July.
High-Power Surges in Electric Distribution Systems of Great Magnitude.* Charles Proteus Steinmetz. (42) July.
Constant Current Mercury Arc Rectifier.* Charles Proteus Steinmetz. (42) July.
Synchronous Converters and Motor Generators. W. L. Waters. (42) July.
The Development of the Manufacture of the Edison Incandescent Electric Lamp —1881-1905. J. T. Marshall. (3) July.
Electrical Waves and the Behavior of Long Distance Transmission Lines. W. S. Franklin. (3) July.
Electric Power Developments in Mexico.* Francis O. Blackwell. (10) July.
Operating Features of Vertical Curtis Steam Turbines.* August H. Kruesi. (Paper read before the Nat. Elec. Light Assoc.) (14) July 1.
Transmission of Niagara Power to Toronto.* (27) Serial beginning July 1.
Electric Spark Recorder.* F. W. Springer. (27) July 1.
Regulation and Efficiency of Transmission Lines. Harold Pender. (27) July 1.
On a Method of Potential Regulation Based on the Different Resistance Behavior of Carbon and Tantalum Lamps.* A. E. Kennelly and S. E. Whiting. (27) July 1.
A Method of Calculating the Core-Loss in Large Alternators. T. S. Allen. (27) July 1.
A Long Distance Electric Power Transmission Line in Nevada. E. Prince. (13) July 6.
The New Electric Power House at Detroit, Michigan.* (26) July 7.
Proposed Municipal Lighting Plant for New York City.* (27) July 8.
Single-Phase Induction Regulator.* B. G. Bergman. (27) July 8.
Stone Wireless Telegraph System.* (27) July 8.
External Causes of Sparking in Direct-Current Machinery. Sydney Woodfield. (47) July 8; (26) June 30.
New Electrical Engineering Laboratories, Liverpool University.* (26) July 14; (73) July 7.
Shunt Motors for Electric Cranes.* Claude W. Hill. (26) July 14.
Notes on the Winding of Polyphase Rotors.* Leonard J. Pumphrey. (26) July 14.
A New System of Temporary Wiring.* (73) July 14.
High-Tension Insulators.* (73) July 14.
The Testing of Alternators.* Stanley P. Smith. (73) July 14.
The Measurement of Low Resistances.* Lancelot W. Wild. (73) July 14.
10-Ton Electric Overhead Traveller at the Liége Exhibition.* (11) July 14.
The Variation of Electrical Resistance in the Contact of Carbon and Cast Iron.* Eric Schoenau. (27) July 15.
The Murgas System of Wireless Telegraphy.* (27) July 15.
Combined Telephony and Telegraphy.* (27) July 15.
Variable Speed Dynamo. (27) July 15.
The Gas Power and Heating Plant of the Atha Tool Co.* J. R. Bibbins. (14) July 15.
Electric Power from Blast Furnaces. P. Eyermann. (20) July 20.
A French 28 000-Volt Power Transmission.* (26) July 21.
Three-Wire Distribution for Factories. Ralph W. Birkett. (73) July 21.
Three-Phase Power Measurement without Wattmeters. (73) July 21.
Hydro-Electric Works at Cusset.* (12) July 21.
A Norwegian Hydro-Electric Plant. C. Smith. (27) July 22.
Design of the Telefunken System.* A. Frederick Collins. (27) July 22.
Terminals and Distribution Boards in Telephone Exchanges.* Arthur V. Abbott. (27) July 22.
Long-Distance High-Tension Transmission in California. John A. Britton. (Abstract of Paper presented to the National Elec. Light Assoc.) (14) July 29.
Test of a 1 000-kw. Turbo-Generator under Service Conditions. (14) July 29.
Electrical Power Development at Portland, Ore.* (27) July 29.
Transfer Systems and the Multiple Board in Telephone Exchanges.* Arthur V. Abbott. (27) July 29.
Modern Power-Plant Design and Economics.* Franz Koester. (9) Aug.
Power Plant Economy. (64) Aug.
Power Plant at the Factory of Edward R. Ladew.* Paul H. Grimm, M. Am. Soc. M. E. (64) Aug.

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Electrical—(Continued).

Les Courants de Haute Fréquence et la Téléphonie sans Fil.* L. Ancel. (32) Feb.
Lampe Cooper-Hewitt à Vapeur de Mercure.* (33) May 27.
Transport d'Énergie Électrique a 40 000 Volts, entre Gromo et Nembro (Lombardie).* L. J. Sidler. (33) Serial beginning July 8.
Turbodynamos und Verwandte Maschinen.* F. Niethammer. (48) Serial beginning May 13.
Lokomotivkran mit Elektrischem Antrieb.* (48) June 3.
Ueber Ausgleichmaschinen.* (82) June 10.
Neuerungen auf dem Gebiete der Wellentelegraphie. Adolf Prasch. (82) Serial beginning June 17.
Kryptol, ein Neuer Elektrischer Heizwiderstand.* Arthur Wiesler. (82) June 30.
Der Elektrische Teil des Preisgekrönten Schiffshebewerk-Projektes "Universell." Josef Rothmüller. (53) Serial beginning June 30.
Die Elektrischen Bahnsysteme der Gegenwart.* F. Niethammer. (Extract from Paper read before the Elektriker Kongress in St. Louis.) (48) Serial beginning July 1.
Elektrische Aufzugsteuerung.* (48) July 8.
Eine Elektrisch Betriebene Fahrbare Kabelbahn.* Landmann. (48) July 22.
Untersuchungen über den Einfluss der Erde bei der Drahtlosen Telegraphie.* J. S. Sachs. Serial beginning July 22.

Marine.

Naval Architecture in Great Britain. *Sir* William H. White, President, Inst. C. E. (54) Vol. 54, Pt. D.
The Development of Japanese Shipbuilding.* S. Terano. (54) Vol. 54, Pt. D.
Experiments on Vibration of the Japanese Torpedo-Boat Destroyers, *Harusame* and *Hayatori.** F. P. Purvis, F. Omori, S. Terano, and C. Shiba. (54) Vol. 54, Pt. D.
Dry Docks. Cuthbert A. Brereton, M. Inst. C. E. (54) Vol. 54, Pt. F.
Dry Docks of France. A. Joly. (54) Vol. 54, Pt. F.
Temporary Dry Docks for Rapid Construction.* V. E. Timonoff, M. Am. Soc. C. E. (54) Vol. 54, Pt. F.
The Graving-Docks of Hong Kong. Albert Denison, M. Inst. C. E. (63) Vol. 159.
Electrical Repairs at Sea.* (26) Apr. 28.
The Japanese Armoured Cruisers *Kasuga* and *Nisshin.** N. Soliani. (12) Apr. 28.
6 000-I.-H.-P. Engines for the Manchester Corporation.* (11) Apr. 28.
Margins and Factors of Safety, and Their Influence on Marine Designs. A. E. Seaton. (Paper read before the Inst. of Naval Archts.) (11) Apr. 28; (47) Serial beginning Apr. 29.
The Russian Volunteer Fleet. Herbert Rowell. (11) Serial beginning Apr. 28.
The Corrosion of Copper in Sea Water.* Uthemann. (Translated fr. the German.) (12) May 5.
Marine Oil-Engines Consuming Creosote or Other Heavy Oils.* (11) May 19.
H. M. Scout *Forward.** (11) May 19.
The Troopship *Dufferin.** (12) May 26.
Preventing Vibration in Steamships.* A. Mallock. (Paper read before the Inst. of Naval Archts.) (11) May 26.
Recording Angular Velocities of Marine Shafting.* John H. Heck. (Paper read before the Inst. of Naval Archts.) (11) May 26.
Electric Dead Reckoner Used on *Valhalla* in the Ocean Race.* (46) June 3.
Bending Moments of Ships. F. H. Alexander. (Paper read before the Inst. of Naval Archts.) (11) June 9.
Submarines. *Sir* William H. White. (19) Serial beginning June 10.
Anti-Fouling Compositions. (19) June 10.
Cavite Steel Floating Dry Dock.* N. A. Berner. (15) June 23.
The Mexican Central Wharf at Tampico.* (15) June 23.
The Destroyer *Huszar.** (11) June 23.
New Marine Type Boiler.* (12) June 30; (47) July 8.
The Turbine-Driven Isle of Man Steamer *Viking.** (11) June 30.
A Modern Method of Coast Defense.* Nick J. Quirk. (41) July.
The Cavite Floating Dock.* Day Allen Willey. (19) July 1.
Steam-Pipe Explosion on Board the Steamship *Orizaba.** David G. Watson and Thomas Carlton. (Rept. of Board of Trade Inquiry.) (47) July 1.
The Japanese Battleship *Katori.* (11) June 30; (12) July 7.
The Parsons Steam Turbine on German Warships.* Alfred Gradenwitz. (19) July 8.
Recent Developments in the Application of Liquid Fuel to Marine Boilers.* (19) July 8.
The Schlick Pallograph.* Alfred Gradenwitz. (19) July 15.
The Comparative Merits of Floating Docks and Graving Docks. (13) July 20.
The Influence of Depth of Water on the Speed of Destroyers.* Harold Yarrow. (Paper read before the Inst. of Naval Archts.) (11) July 21; (12) July 21.

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Marine—(Continued).

United States Battleship *New Hampshire.** (12) July 21.
Comparison of Turbines and Reciprocating Engines in Steamers.* William Gray. (Paper read before the Inst. of Naval Archts.) (47) July 22.
Appareil Enregistreur des Vibrations des Navires à Vapeur.* (33) June 24.
Schutz des Kupfers und Seiner Legierungen gegen die Zerstörung durch Seewasser.* Uthemann. (48) May 6.

Mechanical.

The Determination of Power for Rolling Iron and Steel.* Louis Katona. (56) Vol. 34.
Some Typical Tests of Steam Turbines.* Francis Hodgkinson, M. Am. Soc. M. E. (54) Vol. 54, Pt. E.
The Manufacture of Weldless Steel Tubes.* John David Morgan. (63) Vol. 159.
Mechanical Construction of Steam Turbines and Turbo-Generators.* W. J. A. London. (77) Vol. 35.
A Method of Determining the Moisture Existing in Steam at Atmospheric Pressure.* D. S. Jacobus. (8) Apr.; (70) May.
The International Portland Cement Works at Hull P. O., Canada.* John McClelland Bulkley. (67) Apr.
Commercial Efficiency of Prime Movers. (12) Apr. 28.
Electric Power in Steel Works.* (12) Apr. 28.
Arrangement for Governing Large Gas Engines.* (47) Apr. 29.
Steam Turbines: Discussion.* (3) May.
Superheated Steam. J. L. Moore. (58) May.
The Abuse and Misuse of Brass Valves. J. E. Rollins. (70) May.
Mechanical Equipment and Sanitary Work in the Manual Training High School, Brooklyn, N. Y.* (70) May.
Tables of Evaporation with, and Cost of, Oil as Fuel. (64) May.
Vertical Air Compressors.* (45) May.
Classification of Air Compressors.* Robert Peele. (45) May.
Compression of Air and Volumetric Efficiency. E. A. Rix. (45) May.
The High-Speed Compressor.* Joseph D. Cone. (45) May.
Reheaters and Reheating.* (45) May.
Air Compression at Altitude. Frederick M. Hitchcock. (45) May.
Receivers (for compressor plants).* (45) May.
Compound Air Compression.* Frederick M. Hitchcock. (45) May.
The Taylor Hydraulic Air Compressor. Wm. O. Webber. (45) May.
The Riche Gas Producer.* A. Gradenwitz. (64) May.
The Mechanical Efficiency of the Gas Engine. W. H. Booth. (64) May.
Cleaning Boilers. James T. Fennell. (64) May.
Specific Heat of Superheated Steam.* R. C. H. Heck. (64) May.
The Junge Heat Engine System. H. Diederichs. (64) May.
The Discharge of Steam from Nozzles. (64) May.
Coal Gas and Its Rivals for Motive Power.* Dugald Clerk, M. Inst. C. E. (66) May 2.
Fire-Clay and Dinas Material for Retort-Settings. F. Leisse. (Abstract tr. of Paper read before the Assoc. of Gas Engrs. of the Rhenish Provinces and Westphalia.) (From the *Journal fur Gasbeleuchtung.*) (66) May 2.
The Efficiency and Practical Importance of Common Sources of Light.* W. Wedding. (Abstract tr. from *Journal für Gasbeleuchtung.*) (66) Serial beginning May 2.
The Sandycroft Foundry.* (12) Serial beginning May 5.
Boiler Furnaces and the Effect of Oil on Their Ultimate Strength.* D. B. Morison. (Paper read before the Northeast Coast Inst. of Engrs. and Shipbuilders.) (11) Serial beginning May 5.
Boiler Plants in Bleaching and Dyeing Mills. (14) May 6.
The Power Installation at the Whittall Mills.* Howard S. Knowlton. (14) May 6.
The Working of a Large Compound Explosion Engine on Petrol or Benzoline Spirit.* E. Butler. (47) May 6.
The Care and Management of Steam Boilers. W. H. Fowler, M. Inst. C. E. (47) Serial beginning May 6.
The Works of the Birdsboro Steel Foundry and Machine Company.* (20) May 11.
Air Blast for the Foundry Cupola. W. H. Carrier. (Paper read before the Buffalo Foundrymen's Assoc.) (20) May 11; (47) May 13.
Indicator Inertia: Deductions from Engine Trials.* (11) May 12.
The Electrically Driven Semet-Solvay Coke Plant of the Wigan Coal and Iron Co., Ltd.* (26) May 12.
The Cargo Fleet Works. (12) Serial beginning May 12.
Ingersoll-Sergeant Drill Company's New Plant.* (40) May 12.
Petrol Motor Cars.* Frank Little. (Paper read before the Northeast Coast Inst. of Engrs. and Shipbuilders.) (47) Serial beginning May 13.
The Shadyside Coal Storage Plant of the New York Edison Co.* (14) May 13.
Phenomena of Machine Operation. John Richards. (Paper read before the Tech. Soc. of the Pacific Coast.) (47) May 13.

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Mechanical—(Continued).

Recent Gas and Oil Engine Developments. Thomas Holgate.* (From *Technics.*) (19) May 13.
Benzol Enrichment with Reference to Coke-Oven Gas. F. Schniewind. (83) Serial beginning May 15.
The Commercial Value of the Lewis Thompson Calorimeter. J. S. S. Brame. (12) May 19.
Coal Dust Firing for Steam Boilers.* (12) May 19.
The Curtis Steam Turbine.* (22) May 19; (26) May 19.
1 500-I.-H.-P. Corliss Engine for the Transvaal.* (11) May 19.
The Curtis Turbo-Generator.* (73) May 19.
A Salt-Bath Furnace for Steel Hardening.* (19) May 20.
Tests of a Sirocco Blower and a Centrifugal Pump Driven by Steam Turbines. (14) May 20.
Recent Additions to the Worcester City Hospital Plant. H. S. Knowlton. (14) May 20.
Oil Burning in Steam Boilers.* W. H. Fowler, M. Inst. C. E. (47) May 20.
Automatic Governing Gear for High-Speed Engines.* (47) May 20.
Two-Stroke Cycle Gas Engine.* (47) May 20.
Notes on Painting of Gasholders. Henry Fowler. (Paper read before the Midland Assoc.) (66) May 23.
The Ultimate Limit of Speed in Gas Engines. (62) May 25.
Motor Drives in the Plant of the John Simmons Company.* (20) May 25.
Steam Boilers at the Liége Exhibition.* (11) Serial beginning May 26.
Electrically-Driven Roller-Beds at the Phœnix Steel Works. (73) May 26.
The Drop Valve and Its Gear. (12) Serial beginning May 26.
The Willans-Parsons Steam Turbine.* (22) May 26; (26) May 26; (73) May 26.
Electric Motor Connections to Machine Tools.* (27) May 27.
Purification of Gas Works Liquors. (14) May 27.
Iron and Steel in the Foundry.* E. L. Rhead. (47) Serial beginning May 27.
Forms and Relative Advantages of Toothed Gearing.* (47) May 27.
Continuous Process for the Manufacture of Pipes.* (47) May 27.
New Methods at Stockton-on-Tees (Corporation Gas Works).* (66) May 30.
Compound Reversing Engines. Willibald Trinks. (58) June.
European and American Steam Turbines and Internal Combustion Engines *vs.* Reciprocating Steam Engines.* Frank C. Perkins. (41) Serial beginning June.
English Electrically Operated Lathes and Lever Shearing Machines.* (41) June.
The Power Plant of the Ingersoll-Sergeant Drill Company's Works at Phillipsburg, N. J.* (64) June.
Horse-Power of Belting.* N. A. Carle. (64) June.
Power from Waste Furnace Gases.* (64) June.
Setting Return Tubular Boilers.* Wm. F. Sargent. (64) June.
Jacking up a Boiler and Stack. A. White. (64) June.
Wire Rope Transmission. C. Boysen. (64) June.
Strength and Proportion of Shafts.* Frank B. Kleinhans. (41) June.
Modern Method of Molding.* J. Raymond. (41) June.
Silica Coke-Oven Brick.* (45) June.
The De Laval Steam Turbine in America.* John L. Mohun. (10) June.
Planing Machine Drives.* C. H. Benjamin. (10) June.
Roll Turning.* W. S. Standiford. (9) June.
The Gas Engine for Marine Motive Power.* Alfred Gradenwitz. (9) June.
The Effects of Vacuum on Steam-Engine Economy.* R. M. Neilson. (9) June.
The Question of the Gas Turbine. Sidney A. Reeve. (9) June.
Indicator Inertia. G. S. Rose and G. Savory. (62) June 1.
Removal of the Last Traces of Oil and Tar from Water of Condensation (in gas manufacture).* James S. McIlhenny. (Paper read before the Ohio Gas Light Assoc.) (24) May 15; (83) June 1.
Report of Committee on Fuel Economies (of the Ohio Gas Light Assoc.) (24) Serial beginning May 15; (83) June 1.
The Real Efficiency of Steam Boilers. W. H. Booth. (26) June 2.
The Production of Very Low Temperatures. (12) Serial beginning June 2.
Test of a Compound Engine.* (12) June 2.
Utilization of the Exhaust Steam from Turbines.* Franz Koester. (27) June 3.
Gas Engines and Their Breakdowns.* (47) June 3.
Producer Gas Power Plants.* A. Frederick Collins. (19) June 3.
Recent Developments of Purifying Plant: Some Further Notes on Jager Grids.* J. C. Belton. (Paper read before the Manchester District Inst. of Gas Engrs.) (24) June 5; (66) May 16.
Pyrometers and Carbonization.* John Bond. (Paper read before the Inst. of Gas Engrs.) (66) June 6.
The Report of the Recent Departmental Committee upon Metropolitan Gas Testing. Charles Carpenter. (Committee of the Inst. of Gas Engrs.) (66) June 6.
Long Distance Transmission of Gas. W. H. Hammon. (Extracts from Paper read before the Ohio Gaslight Assoc.) (66) June 6.

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Mechanical—(Continued).

Two New Power Transmission Devices.* (13) June 8.
The Cupola System of the Michigan Stove Company.* W. J. Keep. (Paper read before the Amer. Foundrymen's Assoc.) (20) June 8.
Metal Mixers for Pipe Foundries. J. B. Nau. (Paper read before the Amer. Foundrymen's Assoc.) (20) June 8; (24) June 26; (22) June 16.
Electric Drive for Machine Tools with Methods of Variable Speed Control. (62) June 8.
The Victor Stoker.* (15) June 9.
Firing Boilers by Waste Heat from Coke Ovens. T. Y. Greener. (Paper read before the Inst. of Min. Engrs.) (57) June 9; (16) June 22; (47) June 17.
An Electrolytic Process of Piercing and Cutting Plates of Metal.* (19) June 10.
Counterweights for Large Engines. (14) June 10.
The Treatment of Boiler Waters. (14) June 10.
Efficiency Tests of a 400-kw. Westinghouse Parsons Turbo-Generator.* (14) June 10; (18) July 29; (64) Aug.
An Economical Compound Mill Engine.* (47) June 10.
The Ados CO^2 Recorder.* (47) June 10.
The Besemfelder Process for the Direct Gasification of Coal. (24) June 12.
Cement Joints for Gas Mains.* Jacob D. von Maur. (Paper read before the Western Gas Assoc.) (66) July 18; (24) June 12; (83) June 15; (60) July.
Experiments with Low-Grade Mixed Gases.* J. H. Brown. (Paper read before the Inst. of Gas Engrs.) (66) June 13.
Outside Producers for Retort-Houses.* Alexander Wilson, M. Inst. C. E. (Paper read before the Inst. of Gas Engrs.) (66) June 13.
The Flow of Gas in Pipes. (66) June 13.
Melting Steel with Cast Iron. R. P. Cunningham. (Paper read before the Amer. Foundrymen's Assoc.) (62) June 15; (22) June 16; (20) June 8.
Main Steam Pipes.* W. H. Wakeman. (From *Graphite.*) (62) Serial beginning June 15.
The New Pawling and Harnischfeger Plant.* (20) June 15.
Puddled Iron *versus* Steel.* F. N. Speller. (20) June 15.
Some Retort Coke Melting Ratios. C. M. Schwerin. (Paper read before the Amer. Foundrymen's Assoc.) (20) June 15.
The Roe Mechanical Puddling Process. Joseph Hartshorne. (20) June 15.
The Liege Exhibition Rolling Mill Engine.* (12) June 16.
The Electric Driving of Rolling Mills.* (73) June 16.
A Notable Engine Test. (14) June 17.
A New System of Welding.* A. H. Sexton. (47) June 17.
Pipe Foundry Practice. J. B. Nau. (Paper read before the Amer. Foundrymen's Assoc.) (14) June 17; Abstract (47) July 15.
Large German Gas Engines.* (20) Serial beginning June 22.
The Cleaning of Blast Furnace Gas.* Axel Sahlin. (62) June 22.
16 000-Horse-Power Vertical Rolling-Mill Engines.* (11) June 23.
Steam Jackets and Valve Leakage. R. H. Smith. (12) June 23.
Some Modern Gas Engines.* (12) June 23.
Casehardening.* David Flather. (Paper read before the Cycle Engrs.' Inst.) (47) June 24.
Steam Turbines in America. (14) June 24.
Test of Parker Water-Tube Boilers.* (14) June 24.
The Use of Waste Gases in Gas Engines. Max Rotter. (Abstract of Address delivered before the Steel Works Club of Joliet, Ill.) (47) June 24.
Aluminium as a Pattern Metal. H. U. Tuttle. (From the *Foundry.*) (47) June 24.
The True Worth of Tar as Fuel.* W. N. Best. (24) June 26.
New Coal-Testing Plant for the Birmingham Corporation.* (66) June 27.
Notes on the Carbonization of Coal. J. Verdier and P. Teulon. (Paper read before the Société Technique du Gaz.) (66) June 27.
The Calorimetry of Gas.* M. A. Lecomte. (Paper read before the Société Technique du Gaz.) (66) June 27; Abstract (24) July 10.
A New Petroleum Standard of Light, Lecomte and Luchaire's System. M. A. Lecomte. (Paper read before the Société Technique du Gaz.) (66) June 27.
New Brown & Sharpe Automatic Gear Cutting Machine.* (20) June 29.
The Shearing Strength of Rivets.* E. S. Fitzsimmons. (Report read before the Master Steam Boiler Makers.) (20) June 29.
The Van den Kerchove Piston-Valve Engine.* (11) June 30.
750 Horse-Power Sulzer-Carels Engine.* (12) June 30.
10-Ton Electric Travelling Jib-Crane.* (11) June 30.
A New Form of Excavating Machine.* D. A. Willey. (10) July.
Flow of Air in Metal Pipes. J. H. Kinealy. (Paper read before the Amer. Soc. of Heat and Vent. Engrs.) (70) July.
Progress in Valves for Air and Gas Compressors. Leicester Allen. (9) July.
The Effects of Vacuum on Steam-Engine Economy.* R. M. Neilson. (9) July.
Methods for the Starting of the Gas Engine. Rodolphe Mathot. (9) July.
Cutting Speeds for Shapers and Slotting Machines.* Frank B. Kleinhans, Mem. A. S. M. E. ((41) Serial beginning July.
Commercial Motor Vehicles.* J. F. Gairus. (10) Serial beginning July.
Choosing an Engine for an Isolated Plant. H. S. Knowlton. (10) July.

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The Trap Return System at the United States Military Academy, West Point, N. Y.* (64) July.
Some New Forms of Flanged Pipe Connections for High-Pressure Superheated Steam and Hydraulic Work. Luther D. Lovekin. (64) July.
The New Turbine Station of the Edison Electric Illuminating Company of Boston.* (64) July.
A Ten-Thousand Horse-Power Steam Turbine.* Franz Koester. (64) July.
The Power Plant of the Atlas Knitting Mill. Chas. C. Klein. (64) July.
Calculating the Steam Consumption of Steam Turbines. (64) July.
The Kent Mill as a Fine Grinder. George H. Fraser. (From a Paper read before the Assoc. of Amer. Portland Cement Mfrs.) (60) July.
Natural Gas Pumping Plant at Hundred, West Virginia.* F. C. Weber. (45) July.
Method of Using Waste Heat from Coke Ovens for Firing Boilers at the No. 1 Works of the Continental Coke Co.* Howard N. Eavenson. (45) July.
By-Product Coke as Made in the Ovens of the Otto-Hoffman and United-Otto System.* Edwin A. Moore. (Paper read before the Phil. Foundrymen's Assoc.) (45) July.
Flow of Air in Pipes and the Transmission of Power by Compressed Air. (45) July.
The Manufacture of Briquettes.* (19) July 1.
Tests of a Vertical Cross-Compound Engine under Varying Loads.* (14) July 1.
Boiler Explosions.* (47) July 1.
The New Hele Gas-Works of the Ilfracombe Gas Company.* (66) July 4.
The Draper 18-Inch Geared Head Lathe.* (20) July 6.
The Gutermuth Patent Valve.* (20) July 6.
The Robertson Valveless Automatic Gas and Gasoline Engine.* (20) July 6.
Internal Combustion Engines.* Dugald Clerk, M. Inst. C. E. (29) Serial beginning July 7.
300-H.-P. Double-Piston (François Type) Compound Condensing Engine.* (11) July 7; (11) July 14.
Flue Gas Analysis.* F. H. Corson. (26) July 7.
Modern Economical Steam Engines and Turbines. (12) Serial beginning July 7.
New Mechanical Plant of the Connecticut Hospital for the Insane. (14) July 8.
Continuous Moulding Process.* (47) July 8.
The Prevention of Stoppages (of Gas) in Services, Meters and House Pipes during Cold Weather. Irvin Butterworth. (Paper read before the Western Gas Assoc.) (24) July 10; (83) July 15.
Calcium Carbide and Acetylene. J. B. Morehead. (Paper read before the Western Gas Assoc.) (24) July 10; (83) July 15.
The New Three-and-a-Half Million Cubic Feet Gasholder at Amsterdam.* R. A. van Sandick. (Tr. from *De Ingenieur.*) (66) July 11.
Gas Coals and the Products of Their Distillation. Sainte-Claire Deville. (Extracts from Lecture delivered at College of Mines.) (66) July 11.
Chain Making by Electric Welding.* (20) July 13.
Coal-Conveying Plant at the Metropolitan Electric Supply Co.'s Works.* (11) July 14.
The Harmonic Analysis of Valve Motions. Silvanus P. Thompson. (11) July 14.
Heat Insulation.* R. S. Hutton and J. R. Beard. (Paper read before the Faraday Soc.) (11) July 14; (47) July 22.
Modern Gas and Oil Engine Practice.* Horace Allen. (47) Serial beginning July 15.
Melting Steel with Iron. R. P. Cunningham. (Abstract of Paper read before the Amer. Foundrymen's Assoc.) (47) July 15.
Test of a Steam Turbine after Two Years' Service.* (14) July 15.
The Ashland Slag Cement Plant.* (20) July 20.
The Wellman-Seaver-Morgan Air Compressor.* (20) July 20.
The "Hoyois" Steam-Engine.* (11) July 21.
Method of Determining Moisture in Steam at Atmospheric Pressure. D. S. Jacobus. (47) July 22.
Vibratory-Action Testing Machine.* (47) July 22.
Lord Blythswood's Liquid Air Plant for Experimental Work at Low Temperatures.* (19) July 22.
Some Phases of the Feed-Water Heater Problem. Walter E. Harrington. (17) July 22.
Some Problems in Steam Turbine Design. (14) July 22.
The Thermit Process in American Practice. Ernest Stutz. (Paper read before the Amer. Soc. for Testing Materials.) (18) July 22; (40) July 28.
The Practical Enrichment of Low Candle Power Gas with Benzol.* Fred B. Wheeler. (Paper read before the Western Gas Assoc.) (24) July 24; (83) Aug. 1.
A Combined Baby Bessemer and Open Hearth Steel Foundry.* Hermann Wedding. (From Paper in *Verhandlungen des V. zur Befoerderung des Gewerbfleisses.*) (20) July 27.
A Test of a Small-Sized Gas Producer and Gas Engine. (13) July 27.

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The Use of Boiler Compounds. William M. Booth. (From *The Chemical Engineer.*) (13) July 27.
Torsion Meter for Recording the Horse-Power of Steam Turbines.* (19) July 29.
English Motor Omnibuses for City and Country Use.* (19) Serial beginning July 29.
Curing Concrete Blocks. H. H. Rice. (14) July 29.
The Bursting Strength of Boilers.* (64) Aug.
Logarithmic Scales for Plotting Compression and Expansion Curves.* E. Robinson. (64) Aug.
Temperatures in Air and Ammonia Compressor Cylinders. Leicester Allen. (9) Aug.
Le Dirigeable Lebaudy.* H. Julliot. (32) May.
Sur une Nouvelle Transmission par Courroie, Corde ou Cable et Contribution à l'Étude du Mécanisme de Ce Genre de Transmission.* C. Rozé. (37) May.
Machine Automatique à Tailler, sans Gabarit, les Engrenages Coniques.* E. Dubosc. (37) May.
Machine Soufflante Compound des Usines Acklam, à Middlesbrough (Angleterre).* (33) May 6.
Nouveau Moteur à Explosion avec Dispositif d'Entrée d'Air dans le Cylindre, Système G. Erikson.* H. André. (36) May 10.
Les Omnibus Automobiles a Paris.* G. Espitallier. (33) May 20.
Expériences sur le Rendement des Roulements à Billes.* (35) May 20.
Fabrique de Ciment de Pobla-de-Lillet (Espagne).* (33) May 20.
Parc a Charbon a Manutention Rapide.* (33) June 10.
Les Aciers a Outils a Coupe Rapide.* J. Garnier. (33) June 17.
Machine à Essayer les Metaux.* L. Delaloe. (34) July.
La Coupe Gordon-Bennett en 1905.* F. Drouin. (33) July 1.
Les Nouveaux Laboratoires de Mécanique de l'École Technique Supérieure de Dresde.* (33) July 1.
Distribution a Tiroir, Variable au Régulateur, Système Moritz.* (33) July 8.
Steinkohle, Naphta und Torf in Inrem Wertverhältniss für Dampf- und Krafterzeugung.* H. Mittermayr. (Paper read before the St. Petersburg Polytechuische Verein.) (52) Serial beginning Apr. 15.
Ueber das Verhältnis der Zahnlänge zur Zahndicke bei Zahnrädern.* Wehage. (82) Apr. 29.
Der Heutige Stand der Motorfahrräder.* (82) Serial beginning Apr. 29.
Vollhubventile für Kompressoren.* Ferd. Strnad. (48) Apr. 29.
Beitrag zur Theorie der Dampfmaschinendiagramme.* Viktor Blaess. (48) Apr. 29.
Neue Schleifmaschine für Lochborer. Hermann Fischer. (48) Apr. 29.
Einformen und Giessen eines Gasmaschinenzylinders und Behandlung Desselben nach dem Guss.* C. Henning. (50) May 1.
Die Erzeugung von Glühlicht mit Flüssigen Brennstoffen. (82) Serial beginning May 6.
Ueber das Schmauchen. Gustav O. Schultze. (80) Serial beginning May 9.
Die Aenderung der Zähigkeit von Kesselblechen mit Zunahme der Festigkeit. C. Bach. (48) May 13.
Die Giesserei der Firma Gebr. Scholten in Duisburg.* F. Wüst. (50) May 15.
Der Wärmedurchgangskoeffizient für Gasmotoren nach Diagrammen von Prof. Dr. Slaby.* Kurt Bräuer. (82) Serial beginning May 20.
Der Mechanische Wirkungsgrad und die Indizierte Leistung der Gasmaschine. Rudolf Diesel. (48) May 20.
Versuche Über den ökonomischen Einfluss der Kompression bei Dampfmaschinen. Herbert Klemperer. (Abstract of Doctor's Thesis presented at the Technische Hochschule zu Dresden.) (48) May 20.
Ueber Sauggas- und Spiritusmotoren.* Neumann. (Paper read before the Deutscher Gips-Verein.) (80) May 23.
Die Neubauten der Mechanischen Abteilung der Königl. Sächsischen Technischen Hochschule zu Dresden.* (48) May 27.
Die Einführung der Dampfmaschine in Deutschland.* Conrad Matschoss. (48) Serial beginning June 3.
Ueber Neuere Riemengetriebe.* Rudolf Hundhausen. (82) Serial beginning June 4.
Zusammenhang zwischen Kohiensäuregehalt und Abgangstemperatur der Kesselgase. A. Dosch. (82) Serial beginning June 4.
Ueber das Schmauchen. N. Peters. (80) June 10.
Drehwerk zum Abdrehen und Ausschneiden von Kesselböden.* (48) June 10.
Die Weltausstellung in St. Louis, 1904: Die Ausstellung der Société Anonyme des établissements Delaunay Belleville.* Fr. Frölich. (48) June 10.
Verdampfungsversuche an Rigaschen Kesselanlagen. C. Blacher. (52) Serial beginning June 15.
Ueber die Mittel zur Erzielung Dichter und Spannungsfreier Stahlformgussstücke. L. Treuheit. (50) Serial beginning June 15.
Neuere Festigkeits-Probiermaschinen.* M. Rudeloff. (82) Serial beginning June 17.
Ueber Mahlversuche mit Klinkern aus dem Drehrohrofen. Ferd. M. Meyer. (80) June 17.

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Die Gasmaschine, Bauart Mees, mit Vereinigter Mischungs- und Füllungsregelung.* Fr. Freytag. (48) June 17.
Der Mechanische Wirkungsgrad und die Indizierte Leistung der Gasmaschine. Hugo Güldner. (48) June 24.
Neuere Werkzeugmaschinen mit Elektrischem Antrieb. Paul Möller. (48) June 24.
Untersuchung einer Absorptions-Kältemaschine. R. Habermann. (48) June 24.
Ventile.* Herm. Raschen. (48) June 24.
Die Jonesche Kohlebatterie.* (82) June 30.
Die Anwendung des Überhitzten Dampfes bei der Kolbenmaschine.* Otto Berner. (48) Serial beginning July 1.
Der Einfluss Selbsttätiger und Gesteuerter Einlassventile auf Leistung und Verbrauch von Explosionsmotoren.* K. Fehrmann. (48) July 1.
Ueber Kollergänge.* Amende. (Paper read before the Deutscher Verein für Ton-, Zement- und Kalkindustrie.) (80) July 4.
Ueber Schmauchen. Cramer. (Paper read before the Deutscher Verein für Ton-, Zement- und Kalkindustrie.) (80) July 4.
Thermische Untersuchung an Kompressoren.* Fritz L. Richter. (48) Serial beginning July 8.
Die Wahl der Exzenter bei Doppelschiebersteuerungen.* W. Pickersgill. (48) July 8.
Ueber den Wärmedurchgang bei Kesselheizflächen. Jens Rude. (82) Serial beginning July 15.
Untersuchung einer Dampfkraftanlage mit Zweifacher Ueberhitzung durch Abgase.* E. Josse. (48) Serial beginning July 15.
Versuche über Lagerreibung nach dem Verfahren von Dettmar. H. Heimann. (48) Serial beginning July 15.
Die Dampfkessel und Kraftmaschinen auf der Niederschlesischen Gewerbe- und Industrie-Ausstellung Görlitz 1905. Förster. (48) Serial beginning July 15.
Genaue Konstruktion der Schieberdiagramme. Alexander Goldberger. (82) July 22.

Metallurgical.

Steel Production in the United States. William Metcalf, Past-President, Am. Soc. C. E. (54) Vol. 54, Pt. E.
Notes on the Metallography of Steel.* Bradley Stoughton, M. Am. Inst. M. E. (54) Vol. 54, Pt. E.
An Example of the Alteration of Fire-Brick by Furnace-Gases. Frank Firmstone. (56) Vol. 34.
Relative Elimination of Impurities in Bessemerizing Copper-Matte.* W. Randolph Van Liew. (56) Vol. 34.
Hot-Blast Smelting for the Elimination of Arsenic, Antimony, Lead and Zinc from Copper-Mattes, and for the Production of Lead. S. E. Bretherton. (56) 34.
The Reduction of Lead from Litharge in Preliminary Assays, and the Advantages of an Oxide Slag. E. H. Miller, E. J. Hall and M. J. Falk. (56) Vol. 34.
Notes on the Metallurgy of Copper of Montana.* H. O. Hofman. (56) Vol. 34.
Note on the Influence of the Rate of Cooling on the Structure of Steel.* Albert Sauveur and H. C. Boynton. (56) Vol. 34.
Electrolytic Lead-Refining.* Anson G. Betts. (56) Vol. 34.
A Test for Precious Metals in Cyanide Solutions. Albert Arents. (56) Vol. 34.
Flue-Dirt and Top-Pressure in Iron Blast-Furnaces: A Study of the Influences Controlling Them. F. Louis Grammer. (56) Vol. 34.
The Assay of Zinc-Box Residues from the Cyanide Process. Richard W. Lodge. (56) Vol. 34.
School Laboratory-Work: A Free-Milling Gold-Run. Robert H. Richards and E. E. Bugbee. (56) Vol. 34.
The Refining of the Precipitates Obtained by Means of Zinc in the Cyanide Process of Gold and Silver Extraction.* G. Howell Clevenger. (56) Vol. 34.
A Proposed Filter-Press Slimes Plant. Francis L. Bosqui. (56) Vol. 34.
The Electric Steel-Furnace at Gysinge, Sweden.* F. A. Kjellin. (56) Vol. 34.
The Sperry Vanning-Buddle.* Edwin A. Sperry. (56) Vol. 34.
The Metallurgy of the Homestake Ore.* C. W. Merrill. (56) Vol. 34.
The Cyanide-Plant and Practice at the Ymir Mine, West Kootenay, British Columbia. Edwin C. Holden. (56) Vol. 34.
Hearth-Area and the Number of Tuyeres in Iron Blast-Furnace Practice. F. L. Grammer. (56) Vol. 34.
A Laboratory Study of the Stages in the Refining of Copper.* H. O. Hofman, C. F. Green and R. B. Yerxa. (56) Vol. 34.
Plant for the Handling and Treatment of Ores at the Silver Cup and Nettie L. Mines, British Columbia.* George Attwood, Assoc. M. Inst. C. E. (63) Vol. 159.
Fine Grinding and "Slimes." A. W. Warwick. (Abstract of Paper read before the West. Assoc. of Tech. Chemists & Metallurgists.) (68) Serial beginning Apr. 29.

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Gas Blowing Engines.* Tom Westgarth. (Abstract of Paper read before the West of Scotland Iron and Steel Inst.) (12) May 5.
Machinery for Dry Air Blast.* (22) May 12.
Electric Smelting of Iron and Steel. F. W. Harbord. (Abstract of Paper read before the Faraday Soc. of London, Eng.) (16) May 18.
Manganese Bronze. Percy Longmuir. (From *The Foundry.*) (47) May 20.
Filter Pressing of Slime. H. R. Edmands. (Abstract from *Proceedings* of the Australian Inst. of Min. Engrs.) (16) May 25.
Platinum and Palladium in Certain Copper Ores.* Thomas T. Read. (16) May 25.
The Determination of Sulphur in Iron Ores. J. Howard Graham. (3) June; (62) July 27.
The Detroit Iron and Steel Company's Blast Furnace Plant.* (20) June 1.
Dry Air Blast and Turbine Blowing Engines: A New Method of Drying the Blast.* (20) June 1.
Electrostatic Concentration.* Lucien I. Blake. (From *Transactions* of the Amer. Electro-Chemical Assoc.) (16) Serial beginning June 1.
A New Pyrite Smelter.* Herbert Haas. (16) June 8.
Spitzlutten.* H. Leupold. (Abstract from *Journal* of the Chem., Metal. and Min. Soc. of S. Africa.) (16) June 8.
The Iodimetric Determination of Copper. T. Brown, Jr. (16) June 8.
A Slag Calculation. Charles S. Palmer. (16) June 29.
Estimation of the Chief Constituents in Cyanide Solution. J. E. Clennell. (16) June 29.
Casehardening.* David Flather. (Abstract from Paper read before the Clyde Engineers' Inst.) (22) June 30.
Special Steels.* L. Guillet. (Paper read before the Min. and Metal. Cong.) (22) June 30.
Iron Ore Briquettes for the Blast Furnace.* Henry Louis. (10) July.
Experiments on the Fusibility of Blast Furnace Slags. O. Boudguard. (62) Serial beginning July 6.
The Influence of Titanium on Pig-Iron and Steel. Pierre Delville. (Paper read before the Min. and Metal. Cong.) (22) July 7.
The Purification of Blast Furnace Gas. Emile Bian. (Abstract of Paper read before the Min. and Metal. Cong.) (22) July 7; (47) July 15.
New Open-Hearth Steel Processes. P. Ackers. (Paper read before the Min. and Metal. Cong.) (22) July 14.
Bag-Houses for Saving Fume.* (16) July 15.
The Action of Gases upon Fire-Bricks. Thomas Holgate, M. Inst. C. E. (66) Serial beginning July 18.
Materials Used in Furnace Construction. R. S. Hutton and J. R. Beard. (Abstract of Paper read before the Faraday Soc.) (22) July 21.
Ore Dressing at Broken Hill. V. F. Stanley Low. (Abstract from *Trans.* Austral. Inst. Min. Eng.) (16) July 22.
The Manufacture and Characteristics of Wrought Iron.* James P. Roe. (62) July 27.
Temperature in Roasting Gold Ore. William E. Greenawalt. (16) July 29.
Standard Screens for Screen Analysis.* Courtenay de Kalb. (16) July 29.
A Portable Assay Furnace.* J. J. Gillio. (Abstract of Paper in *Trans.* Austral. Inst. Min. Eng.) (16) July 29.
Note sur l'Emploi de l'Air Sec dans les Hauts Fourneaux d'Après les Essais de M. J. Gayley, à Pittsburg.* A. Gouvy. (32) Mar.
Traitement des Minerais Sulfurés Mixtes de Plomb et de Zinc.* E. Lemaire. (33) Apr. 29.
Les Alliages de Cuivre.* Leon Guillet. (33) Serial beginning June 24.
Elektromagnetische Aufbereitungen nach dem Verfahren von Wetherill. Fr. Esser. (48) Apr. 29.
Die Elektrische Kraftübertragung auf Hüttenwerken. F. Janssen. (50) Serial beginning May 1.
Die Vorwärmzone des Hochofens.* Fr. Schraml. (50) May 15.
Amerikanische Ofenkonstruktionen unter Besonderer Berücksichtigung Ihres Mauerwerks.* Bernhard Osann. (Paper read before the Verein deutscher Fabriken feuerfester Produkte.) (80) May 18; (50) May 1.
Ueber den Gegenwärtigen Stand der Elektrischen Eisen- und Stahlerzeugung.* W. Borchers. (Paper read before the Verein Deutscher Eisenhüttenleute.) (50) June 1.
Das Wirtschaftliche Verhältnis Zwischen Gichtgasmotoren und Dampfmaschinen im Verhüttungsgebiet der Minette. L. Ehrhardt. (48) June 3; (50) June 1.
Die Herdofenstahlerzeugung aus Flüssigem Roheisen. Oskar Simmersbach. (50) Serial beginning June 15.
Elektrisch Betriebener Gichtaufzug.* (F. Collischonn. (50) June 15.
Fortschritte im Bau von Gasöfen für Eisenhüttenwerke. A. Desgraz. (Paper read before the "Eisenhütte" Düsseldorf.") (50) Serial beginning July 1.
Experimentelle Studien über die Vorgänge im Hochofen.* (50) July 15.
Mechanische Hochofenbegichtung.* (50) July 15.
Untersuchung über den Ursprung eines Blasenraumes in einem Flusseisenblocke.* H. Wedding. (50) July 15.

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New Method of Moulding and Pressing Gun Cotton.* (22) June 2.
The Grubb Gun-Sight. (46) June 3.
Stowmarket Explosives' Factories.* (12) June 9.
Transports Automobiles Militaires: Batterie Automobile de l'Armée Portuguaise.* G. Espitallier. (33) June 10.
Brinells Untersuchungen mit Seiner Kugelprobe.* (82) Serial beginning May 6.
Automatisch Arbeitendes Geschütz.* Gustav Schatzl von Mühlfort. (82) May 6.

Mining.

The Treadwell Group of Mines, Douglas Island, Alaska.* Robert A. Kinzie. (56) Vol. 34.
The Box Electric Rock-Drill.* Frank E. Shepard. (56) Vol. 34.
The Power Plant of the Moctezuma Copper Company at Nacozari, Sonora, Mexico.* John Langton. (56) Vol. 34.
Notes on the Coal- and Iron-Fields of Southeastern Shansi, China.* William H. Shockley. (56) Vol. 34.
Electrical Power-Transmission for Mines.* Francis O. Blackwell. (56) Vol. 34.
Application of Electricity in the Anthracite Coal-Field of Pennsylvania, with Special Reference to the Wyoming Field.* H. H. Stoek and G. W. Harris. (56) Vol. 34.
Water-Hoisting in the Pennsylvania Anthracite Region.* R. V. Norris. (56) Vol. 34.
The Cost of Pumping at the Short Mountain Colliery of the Lykens Valley Coal Company.* R. V. Norris. (56) Vol. 34.
Electrical Apparatus for Coal-Mining.* W. B. Clarke. (56) Vol. 34.
Compressed-Air Motors for Gathering Cars in Coal-Mines.* Beverley S. Randolph. (56) Vol. 34.
The Alquife Iron-Ore Mines, in the South of Spain. George Harley Bulmer, Assoc. M. Inst. C. E. (63) Vol. 159.
The Recovery of a Diamond-Crown from a Deep Borehole. Cuthbert Baring Horwood, Assoc. M. Inst. C. E. (63) Vol. 159.
Mines and Mining in the Argentine Republic. James McKean Rowbotham, M. Inst. C. E. (63) Vol. 159.
The Compression of Stope Fillings. Jacob Oberhausen. (6) Apr.
The Submerged Jet Dredge.* H. L. Lewis. (68) Apr. 29.
Compressed Air on the Pacific Coast.* Edward A. Rix, M. Am. Soc. C. E., M. Am. Soc. M. E. (45) May.
Efficiency Test of a Nordberg Air Compressor at the Burra Burra Mine of the Tennessee Copper Company. J. Parke Channing. (45) May.
Economy in Operation of Coal Mine Power Plants. F. C. Weber. (45) May.
Compressed Air Coal Cutters.* L. T. Wightman. (45) May.
Electrical Compression of Air for Mining Purposes.* Lucius I. Wightman. (45) May.
Caps or Attachments for Winding Ropes.* W. H. Becker. (Paper read before the South Wales Inst. of Engrs.) (57) May 5.
Separation of Dust from Coal. (22) May 5.
Safety Lamps for Coal Mines.* (62) Serial beginning May 11.
Influence of the Roof in Longwall Working.* J. T. Beard. (Abstract of Paper read before the North of England Inst. of Min. and Mech. Engrs.) (16) May 11.
Shaft Sinking by the Jetting Process.* George C. McFarlane. (16) May 11.
The Prevention of Gob Fires in Coal Mines. George Farmer. (16) May 11.
Lambton Collieries Power Distribution Scheme. (26) Serial beginning May 12.
Methods of Boring and Sinking.* (22) May 12.
Air Consumption of Drills. R. R. Seeber. (16) May 18.
Mine Car Running Gear.* R. V. Norris. (16) May 18.
The Grangesberg Iron Mines in Sweden.* J. W. H. Hamilton. (16) May 18.
Some Pumping Data. R. Gilman Brown. (16) May 18.
A Complete Electrical Installation Underground.* (57) May 26.
Wire Ropes Used for Winding. J. A. Vaughan and W. Martin Epton. (Abstract of Paper read before the Transvaal Inst. of Mech. Engrs.) (47) Serial beginning May 27.
Power for Coal Mining Machinery; Compressed Air *vs.* Electricity.* G. E. Lynch. (45) June.
Mine Explosions. J. T. Beard. (45) Serial beginning June.
Air Compression in Great Britain, at Mines.* James Tonge. (45) June.
Central Power Stations for Mines. (12) June 2.
The Conveyor-System for Filling at the Coal-Face, as Practised in Great Britain and America. W. C. Blackett and R. G. Ware. (Paper read before the Inst. of Min. Engrs.) (22) June 9.
1 500-Horse-Power Winding-Engine at the Liége Exhibition.* (11) June 16.
Results of an Investigation on Winding Ropes in France. (57) June 23.

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The Mickley Ingwall Coal Conveyor for Use in Thin Seams.* M. Palmer. (Paper read before the British Soc. of Min. Students.) (22) June 30.
Colliery and Mining Switch Gear for High- and Low-Tension Alternating Current Service.* A. M. Randolph. (22) Serial beginning June 30.
Outlines of Mine Ventilation.* William Clifford. (58) July.
Tests with Haulage System to Economize Air: Practical Results from Trial Tests with an Endless-Rope Haulage Driven by Duplex Air Cylinders.* Fr. Hempel. (Tr. from *Glückauf.*) (45) July.
Concrete Lining for Mine Shafts.* F. R. Dravo. (58) July.
The Price-Pancoast Colliery.* George W. Harris. (16) Serial beginning July 15.
Notes on Hydraulic Mining Practice.* Richard L. Grider. (Abstract from the Colo. School of Mines *Bulletin.*) (13) July 20.
Electrically-Driven Secondary Haulage.* R. S. Swallow. (Paper read before the National Assoc. of Colliery Mgrs.) (22) July 21.
Timbering and Arching in Mines.* Idris Thomas. (Paper read before the South Wales Inst. of Engrs.) (22) July 21.
Safety Catches for Mine Cages.* E. Mackay Heriot. (16) July 22.
A Large Pumping Plant in Tasmania.* (16) July 29.
Prospecting with Churn Drills.* (16) July 29.
Les Machines d'Extraction Electriques.* H. Schmerber. (33) Serial beginning May 27.

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The Metric Fallacy. Frederick A. Halsey. (Lecture delivered at Cornell Univ.) (12) Serial beginning May 26.
Graphical Mathematics.* A. G. Holman. (72) June.
The Engineer's Fault: A Discussion of Specifications, Contracts and Law Suits. John Cassan Wait, M. Am. Soc. C. E. (Abstract of Paper presented before the Soc. of Mun. Engrs. of N. Y. City.) (13) June 8.
A Device for Averaging Certain Kinds of Continuous Records by the Planimeter.* W. L. Butcher, Assoc. M. Am. Soc. C. E. (13) June 29.
The Organization and Administration of National Engineering Societies. John W. Lieb, Jr. (42) July.
The Academic Side of Technical Training. Alexander B. W. Kennedy. (Address delivered at University College.) (11) July 7.
Opportunities for Engineering Graduates in the Government Service. John F. Hayford, Assoc. M. Am. Soc. C. E. (Paper read before the Soc. for Promotion of Eng. Education.) (13) July 13.
The Testing Engineer. Charles B. Dudley. (Extracts from Address before Amer. Soc. for Testing Materials.) (18) July 15; (13) July 20; (15) July 14; (40) July 21; (14) July 8.
A Problem in the Storage of Granular and Lump Material.* W. E. Hunter and J. S. Myers. (13) July 27.
Table des Racines Cubiques. G. Balsen. (36) Apr. 25.
Spannungen in Prismatischen Röhren und Gefässen mit Vierseitigem Querschnitt.* (82) Serial beginning July 22.

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Highway Construction in the United States. James Owen, M. Am. Soc. C. E. (54) Vol. 54, Pt. F.
Highway Construction in France. G. Forestier. (Tr. from the French by Paul A. Seurot, M. Am. Soc. C. E.) (54) Vol. 54, Pt. F.
Methods and General Description of Massachusetts (Highway) Work.* William E. McClintock, M. Am. Soc. C. E. (54) Vol. 54, Pt. F.
Concrete Roadways at Richmond, Indiana. (67) Apr.
Street Lighting by Electric Arc Lamps.* H. B. Maxwell. (77) May.
The Electric Lighting Situation in Paris. (27) Serial beginning May 13.
Glass Paving Bricks. A. M. Thackara. (14) May 20.
Brick Pavement Specifications. (60) June.
Concrete Street Pavements at Richmond, Ind. (13) June 8.
Glass Paving and Building Bricks. (19) Serial beginning June 24.
Street Lighting. E. E. Hoadley. (Paper read before the Inc. Mun. Elec. Assoc.) (73) June 30.
Brick Pavements for Small Cities. (60) July.
Brick Paving in Cohoes, N. Y.* (76) July.
Impact Tests of Asphalt Paving Mixtures. Clifford Richardson and C. N. Forrest. (Paper read before the Amer. Soc. for Testing Materials.) (14) July 8.
A High-Speed Electrically-Driven Compressor for Colliery Work.* W. Reavell. (Paper read before the South Wales Inst. of Engrs.) (22) July 14.
How to Lay Granitoid Curb and Gutter.* J. C. Herring. (60) Aug.
Expériences Entreprises pour Combattre la Poussière sur la Route Nationale No. 21 de Paris à Barege. M. Soubzmaigne. (43) 1er Trimestre.
La Construction et l'Entretien des Chaussées en Empierrement.* Cyrille Jansens. (30) Apr.

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Les Transformations de Laeken.* P. Gillet. (30) June.
Moyens de Combattre la Poussière sur les Routes.* Docteur Guglielminetti. (33) June 24.

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American Locomotives.* William Forsyth, M. Am. Soc. M. E. (54) Vol. 54, Pt. D.
Rolling Stock in France. Edouard Sauvage. (54) Vol. 54, Pt. D.
The Balanced Compound Locomotive.* S. M. Vauclain, M. Am. Soc. M. E. (54) Vol. 54, Pt. D.
The Substitution of Electricity for Steam as a Motive Power. J. G. White, M. Am. Soc. C. E. (54) Vol. 54, Pt. E.
The Substitution of Electricity for Steam as a Motive Power. Alexander Siemens, M. Inst. C. E. (54) Vol. 54, Pt. E.
British Railroad Terminals.* William Theodore Foxlee, M. Inst. C. E. (54) Vol. 54, Pt. F.
French Railroad Terminals. Ernest Pontzen, Cor. M. Am. Soc. C. E. (Tr. from the French by Paul A. Seurot, M. Am. Soc. C. E.) (54) Vol. 54, Pt. F.
Railroad Terminals: Review of General Practice.* Elmer L. Corthell, M. Am. Soc. C. E. (54) Vol. 54, Pt. F.
Early Railway Construction in New South Wales. Joseph Brady, M. Inst. C. E. (63) Vol. 159.
A Graphical Method of Determining the Relative Positions of Points and Crossings.* Charles John Albrecht, M. Inst. C. E. (63) Vol. 159.
A Modern Grain Elevator. I. E. Blumgardt. (8) Apr.
Tank Locomotives. E. E. R. Tratman. (61) Apr. 16.
A New Type of Powerful Goods Locomotive for the Great Western Railway Company.* (22) Apr. 28.
Common Standard Locomotives: Harriman Lines.* (25) Serial beginning May.
Recent Terminal Improvements in St. Louis. Daniel Breck.* (Paper read before the Engineers' Club of St. Louis.) (1) May.
Some Details of Reconstruction Work, St. Louis Union Station.* A. P. Greensfelder. (Paper read before the Engineers' Club of St. Louis.) (1) May.
Rolled Steel Wheels.* (21) May.
Atlantic or 4-4-2 Class Engines; Great Western Railway.* (21) May.
Reinforced Concrete in Railway Construction.* (21) May.
The High-Speed Vacuum Automatic Brake.* (21) May.
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Heating System of the Canadian Pacific Ry. Shops at Montreal. (14) May 6.
The Brilliant Cut-off of the Pennsylvania R. R.* (14) May 6.
The La Junta Shops, A., T. & S. F. Ry.* (18) May 6.
Locomotives of Great Power. J. E. Muhlfeld. (Abstract of Report, No. 2, presented at the Int. Ry. Cong.) (18) May 6.
Electricity *vs.* Steam for Heavy Haulage. A. H. Armstrong. (17) May 6.
Exhibits at the American Railway Appliance Exhibition. (18) Serial beginning May 6.
Tie Preservation. J. W. Kendrick. (Abstract of paper read before Int. Ry. Cong.) (18) May 6.
Great Western Locomotives and Their Recent Work. Charles Rous-Marten. (12) Serial beginning May 12.
Railway Signalling in America. (12) Serial beginning May 12.
Automatic Car Couplers. George Groobey. (15) May 12.
Coaling Locomotives. Charles H. Fry. (15) May 12.
Electric Drive in Railroad Shops. C. A. Seley. (15) May 12.
Progress in Yard Design.* W. C. Cushing. (15) May 12.
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The Plant of the New Electric Railroad up Mount Vesuvius.* (19) May 13.
Electric Traction in the United States, Great Britain, Belgium and Italy. Victor Tremontani and others. (Abstracts of papers read before the Int. Ry. Cong.) (17) May 13.
Maine Central Ten-Wheel Locomotive.* (18) May 13.
Rails for Lines with Fast Trains. (Extracts from papers read before the Int. Ry. Cong.) (18) May 13.
Some Operative Features of the Aurora, Elgin & Chicago Railway Co.* (72) May 15.
Car Shop Methods.* John D. Fish. (Paper read before the Iowa St. and Interurban Ry. Assoc.) (72) May 15.
The Hicks Gasoline Electric Motor Car.* (20) May 18.
The Hastings Tunnelling Shield System.* (20) May 18.
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The Evolution of the Telegraph in Railroad Work.* Charles E. Yetman. (65) May 19.
American Roundhouses and Their Operation. W. E. Dunham. (15) May 19.
Four-Cylinder Compound Locomotives in America.* F. J. Cole. (15) May 19.
The Electrification of Trunk Lines.* L. R. Pomeroy. (15) May 19.
The Progress of American Railreads in the Last Quarter Century.* S. Whinery, M. Am. Soc. C. E. (15) May 19.
Oil Fuel for Locomotives.* Howard Stillman.* M. Am. Soc. M. E. (15) May 19.
Heating, Lighting and Ventilation of Cars. George I. Fowler. (15) May 19.
High Capacity Cars. Rodney Hitt. (15) May 19.
Electric Traction in France. F. Paul-Dubois. (Abstract of Paper read before the Int. Ry. Cong.) (17) May 20.
The Berlin Zossen Tests and Their Results. (17) May 20; June 3.
Storage Batteries for Track Circuit. C. C. Anthony. (Paper read before the Ry. Signal Assoc.) (18) May 20; (15) May 26.
New Electric Locomotives on Italian Railways.* Frank C. Perkins. (18) May 20.
Concrete Foundations of the New Passenger Station, Washington, D. C.* Day Allen Willey. (46) May 20.
The First Street Tunnel, Washington.* (14) Serial beginning May 20.
Ore Handling Plant at Conneaut, Ohio.* (20) May 25.
Steel Rails for Fast Lines. (20) May 25.
The Northern Spanish Railway.* L. Cubillo, Assoc. Inst. C. E. (40) May 26.
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English Gasolene Locomotives.* (15) May 26.
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Choice of Motors in Steam and Electric Practice. William McClellan. (42) June.
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Cast Iron Wheels in Passenger and Freight Service: Chicago, Milwaukee & St. Paul Railway. (25) June.
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Electrical Features of Block Signaling.* L. H. Thullen. (42) June.
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A Petrol or Gasolene Motor Car for Railways.* Emile Guarini. (41) June.
The Railway Telephone Service; Cost of Line Construction. Frank F. Fowle. (7) June.
Weight Distribution on Electric Locomotives as Affected by Motor Suspension and Draw-Bar Pull.* S. T. Dodd. (42) June.
Three-Phrase Traction.* F. N. Waterman. (42) June.
Electric Equipment at the Karawauken Tunnel. (12) June 2.
Arrangement and Operation of American Freight Yards.* George I. Fowler. (15) June 2.
Car Equipment of the Indianapolis & Cincinnati Traction Company.* (40) June 2.
Westinghouse Single Phase Electric Locomotive for Heavy Freight Service.* (15) June 2; (40) June 2; (14) June 3; (18) June 3.
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Engine Stop and Speed Limit System.* (27) June 3.
Worm Gearing for Railway Motors.* Henri Somach. (17) June 3.
Lighting, Heating and Ventilation of Trains. Charles B. Dudley. (Abstract of Report to the Int. Ry. Cong.) (18) June 3.
New Equipment for Suburban Traffic on the Chicago & Western Indiana Ry. (13) June 8. (
Counterbalance for Balanced Compound Locomotives.* Lawford H. Fry. (15) June 9.
Tests of a Heavy Shay Locomotive.* (15) June 9.
Locomotive Performance under a Steam Pressure of 250 Pounds. W. F. M. Goss. (15) June 9.

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A New Design for a Four-Cylinder Balanced Compound Locomotive.* Samuel F. Prince. (15) June 9.
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Steel Upper Framing for Box Cars. C. A. Seley. (Abstract of Address delivered at Purdue Univ.) (40) June 9; (18) June 10.
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Oscillations of Railway Vehicles. (19) June 10.
High-Speed, Long-Distance Electric Traction. Charles A. Mudge. (Address before the N. Y. Elec. Soc.) (19) Serial beginning June 10.
Foundries of the Pennsylvania R. R. at Altoona.* (18) June 10.
Standard Locomotives of the Pennsylvania Railroad.* (18) June 10.
Efficiency of Modern Railway Equipment. Alva B. Johnson. (Written for *Manufacturers' Record.*) (18) June 10.
Maximum Brake Force as Regards Foundation Brake for Passenger and Freight Cars. F. M. Nellis. (Paper read before the Air Brake Assoc.) (18) June 10.
Acceleration Tests of Steam and Electric Locomotives.* (47) June 10.
The Deutsch Electric Train-Lighting System.* (27) June 10; (20) June 22.
A Contractor's Side-Leveler. George W. Lee, Jun. Am. Soc. C. E. (13) June 15.
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The Schmidt Superheated Steam Locomotive.* Emile Guarini. (15) June 16.
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Incandescent Gas Lighting for Railway Trains. E. C. Riley. (Paper read before the Inst. of Gas Engrs.) (12) June 16; (47) June 10; (66) June 6; (83) July 15.
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The Morris Canal Crossing of the Lackawanna R. R.* (14) June 17.
The Use of Superheated Steam on Locomotives.* H. H. Vaughan. (Paper read before the Amer. Ry. Master Mechanics' Assoc.) (18) June 17; (15) Serial beginning June 23; Abstract (25) July; (13) June 22.
Service of the Mallet Compound Locomotive, B. & O. R. R. (18) June 17; (25) June; (15) July 14; (13) June 15.
Standard Specifications for Locomotive Forgings. (Com. Rept. presented to the Amer. Ry. Master Mechanics' Assoc.) (13) June 22; (22) July 27.
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Truck Arch Bars for 100 000-lbs. Capacity Freight Cars. (Rept. of Com. to the Master Car Bldrs.' Assoc.) (15) June 23.
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Railway Carriage Lighting by Means of Compressed Gas. M. Naudé.* (Abstract of Paper read before the Société Technique du Gaz.) (66) June 27; (24) July 17.
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Signaling on Lines of the Southern Pacific. E. M. Cutting. (Abstract of Paper read before the Pacific Coast Ry. Club.) (40) July 14.
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Types of Interurban Cars. J. N. Shannahan. (Paper read before the St. Ry. Assoc. of the State of New York.) (72) July 15.
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Hot Feed Water and Hot Water Heating. A. A. Mayer. (Paper read before the Canadian Ry. Club.) (18) July 22.
Some Records of Maintenance-of-Way Expenses on American Railways. (13) July 27.
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The Best Metal for Rails. P. H. Dudley. (Abstract of Paper read before the Int. Ry. Cong.) (62) July 27.
A Comparison of Steam and Electric Motive Power on a Light Traffic Railway in Iowa. (13) July 27.
Four-Cylinder Compound Locomotives on the Paris-Orleans Railway. M. P. Gonte. (Abstract of Article in *La Revue Generale.*) Tr. by Lawford H. Fry. (15) July 28.
What is the Best Method of Painting Steel Cars? F. P. Cheesman. (Paper read before the Amer. Soc. for Testing Materials.) (15) July 28.
Extended Piston Rods on Union Pacific Vauclain Compounds.* G. H. Likert. (15) July 28.
Motor Cars on British Railways.* (40) July 28.
Rail Sections as Engineering Structures.* P. H. Dudley. (Paper read before the Amer. Soc. for Testing Materials.) (40) July 28.
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Versuchsergebnisse über Stromverbrauch und -Rückgewinn auf der Valtellinabahn und Einige Eigenheiten der Drehstromtraktion.* Eugen Cserháti. (53) June 9.
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Tests of Copper and Iron Sulphates and Lime with Mechanical Filters at Anderson, Ind.* (13) May 25.
Electric Pumping Station of the Schenectady Water-Works.* (27) May 27; (14) June 3.
A Concrete Settling Reservoir at McKeesport, Pa.* (14) May 27.
Some Experiments with Copper Sulphate. James M. Caird. (Paper read before the Amer. W. W. Assoc.) (60) June.
Removal of Iron from Ground Water. (60) June.
Utilizing the Power of the Niagara Rapids.* Alton D. Adams. (9) June.
The Development of the Ontario Power Co.* P. N. Nunn. (42) June.
Notes on the Density, Relative Volume and Weight per Cubic Foot of Pure Water. M. L. Holman. (Paper read before the Amer. Water Works Assoc.) (70) Serial beginning June.
The Kennebec Valley Typhoid Fever Epidemic of 1902-03. George C. Whipple and E. C. Levy. (28) June.
The Mississippi River as the Source of Water Supply for the Inhabitants of the Mississippi Valley. Erastus G. Smith. (28) June.

*Illustrated.

Water Supply—(Continued).

Recent Improvements in the Plant of the Danville Water Company.* Daniel W. Mead. (4) June.
Water Supply by Compressed Air for Los Angeles, Cal.* (41) June.
The Water Supply of Country Buildings.* Wm. Paul Gerhard, M. Am. Soc. M. E. (10) June.
Types of Centrifugal Pumps.* Wm. O. Webber. (10) June.
Irrigation Survey of the Upper Snake River Valley, Idaho. E. B. Darlington. (13) June 1.
High Pressure Systems for Fire Service. (Report of Com. of National Fire Protection Assoc.) (14) June 3.
Water Power Development at Little Falls, Minn., and Its Industrial Results.* Arthur Warren. (14) June 3.
Mechanically Operated Screens, Newark Water-Works.* (14) June 3.
The Measurement of Low Artesian Heads.* Myron L. Fuller. (13) June 8.
The Field Assay of Water.* M. O. Leighton. (13) June 8.
Failure of Wrought Iron Water Pipe Through Corrosion.* Frank N. Speller. (14) June 10.
Ring-Braced Sheet Piling for Reservoir Construction, Kinston, N. C.* George A. Rogers. (13) June 15.
Electrically Driven Centrifugal Pumps for Elevator Service. (14) June 17; (11) June 30.
Mechanical Filter at Binghamton, N. Y. George C. Whipple, Assoc. M. Am. Soc. C. E. (14) June 17.
Masonry Dam for the Granite Springs Reservoir, Cheyenne, Wyo.* A. J. Wiley, M. Am. Soc. C. E. (14) June 24; (13) June 29.
Westinghouse Compound Pump. F. H. Parke. (15) June 30; (18) July 1; (25) Aug.
Operation of Sand Filters of Indianapolis Water-Works. W. C. Mabee. (60) July.
Water-Powers of the Southeastern Appalachian Region. Frederick A. C. Perrine. (42) July.
The Wachusett Reservoir for Boston Water Supply.* (46) July 1.
Formulas and Computations for Horse-Power Value of Streams. W. L. Church. (14) July 1.
The Sill Hydraulic Power Plant near Innsbruck.* Franz Koester. (14) July 1.
Failures of Lake Avalon Dam, near Carlsbad, N. M.* E. C. Murphy, Assoc. M. Am. Soc. C. E. (13) July 6.
72 000 000-Gallon Pumping Station at Boston, Mass.* (13) July 6.
Progress in Standardization of Water Analysis in the United States. (14) July 8.
The Selection of Water Works Pumping Machinery. Nicholas S. Hill, Jr. (14) Serial beginning July 8.
Pipe Tunnel at Dover St. Bridge, Boston.* Frederick I. Winslow. (13) July 13.
The Wakefield Pump.* (12) July 14.
The Water-Works at Raton, N. M.* (14) July 15.
Water Purification at South Bethlehem, Pa.* (14) July 15.
Fire Protection and Water Supply of Worthington Hydraulic Works.* (18) July 15.
Engineering Features of the Irrigation Works under Construction by the U. S. Reclamation Service. D. C. Henny. (Extracts from Paper read at the Pacific Coast Eng. Cong.) (13) July 20.
The Water-Works Catastrophe in Madrid.* T. A. Greenhill, A. M. I. C. E. (14) July 22.
A Modern Filtration Plant.* James G. Fernald. (46) July 29.
Electrolysis on the Metropolitan Water-Works. (14) July 29.
Note sur un Nouveau Dispositif des Bassins Filtrants à Sable Fin.* M. Bechmann. (43) 1er Trimestre.
Note sur l'Exécution du Puits Artésien de la Butt-aux-Cailles, a Paris. M. Geslain. (43) 1er Trimestre.
Etude sur les Effets de la Dilatation dans les Ouvrages d'Art en Maçonnerie Viaducs et Barrages-Réservoirs. M. Bouffet. (43) 1er Trimestre.
Quelques Installations Recentes de Turbines Hydrauliques.* M. Flamant. (37) Apr.
Port de la Rochelle: Étude Sommaire du Marais Perdu Considéré au Point de Vue de la Production de la Force Motrice. F. Maynard. (36) Apr. 25.
L'Économie Industrielle des Forces Hydrauliques et Leur Législation. E. F. Cote. (32) May.
Réservoirs en Béton Armé Construits sur les Chemins de Fer Russes.* (35) May.
Die Kreisel und Ihre Leistungen. H. Hagens. (48) May 20.
Der Abfluss an einem Grundwehre Kurvenförmigen Profils.* Johann Hermanek. (53) June 2.
Bericht über Zerstörungserscheinungen an einem Betonkanale in Osnabrück und Darüber Ausgeführte Untersuchungen. Dr. Framm. (Abstract of Paper read before the Verein Deutscher Portlandzementfabrikanten.) (80) June 15.
Neuere Duplex-Pumpmaschinen, Schwungrad-Pumpmaschinen und Turbinenpumpen.* Otto H. Mueller. (48) Serial beginning June 17.

*Illustrated.

Water Supply—(Continued).

Die Wasserkraftmaschinen der Stillwerke bei Innsbruck.* Andreas Stamm. (48) June 17.
Versuche mit einer Schnellaufenden Kapselpumpe.* Kammerer. (48) June 24.
Beitrag zur Berechnung der Eintrittsgrössen einer Wasserturbine.* Fritz Neumann. (82) July 8.
Druckschwankungen in Turbinenzuleitungsrohren. A. Budau. (Paper read before the Maschinen-Ingenieure.) (53) Serial beginning 21.

Waterways.

Natural Waterways: A Review of Their Development in the Netherlands.* A. B. Marinkelle. (54) Vol. 54, Pt. D.
Rolling Dams.* K. E. Hilgard, M. Am. Soc. C. E. (54) Vol. 54, Pt. D.
Cylindrical Foundations for a Quay Wall in the Harbour of Delfzyl.* W. F. Druyvesteyn. (54) Vol. 54, Pt. E.
Artificial Waterways in the United States.* William L. Sibert, M. Am. Soc. C. E. (54) Vol. 54, Pt. F.
Observations on Dock Work in New York Harbor.* J. A. Bensel, M. Am. Soc. C. E. (54) Vol. 54, Pt. F.
Artificial Waterways in Great Britain.* W. Henry Hunter, M. Inst. C. E. (54) Vol. 54, Pt. F.
The Improvement of Three Holland Ship Canals.* L. F. E. van Hoogenhuyze and J. A. de Lint. (54) Vol. 54, Pt. F.
Inland Navigation in France. A. Charguéraud. (Tr. from the French by Foster Crowell, M. Am. Soc. C. E.) (54) Vol. 54, Pt. F.
Beachy Head New Lighthouse.* Albert Havelock Case, M. Inst. C. E. (63) Vol. 159.
A Submarine Rock Excavator.* Charles Graham Hepburn, Assoc. M. Inst. C. E. (63) Vol. 159.
Coast-Erosion.* Alfred Edward Carey, M. Inst. C. E. (63) Vol. 159.
Erosion on the Holderness Coast of Yorkshire.* Ernest Romney Matthews. (63) Vol. 159.
The Reclamation of One Million Acres of Swamp Land in California.* Rufus P. Jennings. (14) May 6.
Records of Flow at Current-Meter Gaging Stations When the Streams Are Subject to Ice. F. H. Tillinghast. (13) May 11.
Further Note on the Theory of Unsymmetrical Masonry Dams.* W. C. Unwin. (11) May 12.
Pier and Bulkhead Construction in New York Harbor. (13) May 18.
Ore Handling Plant at Conneaut, Ohio.* (20) May 25.
The Bruges Harbour Works.* (11) Serial beginning May 26.
The Manila Harbor Improvements.* (14) May 27.
The Mississippi: Controlling Floods, Navigation Improvements.* H. Van Meerten. (Continuation of Discussion—Haupt-Van Meerten.) (3) June.
A New Project for the Panama Canal.* (15) June 2.
The Assuan Dam.* (12) June 9.
The United States Reclamation Service. F. H. Newell, M. Am. Soc. C. E. (13) June 15.
The Southwest Pass Jetties.* H. W. Parkhurst. (15) June 16.
The Morris Canal Crossing of the Lackawanna R. R.* (14) June 17.
On the Distribution of Shearing Stress in Masonry Dams.* W. C. Unwin. (11) June 30.
Modern Electric Canal Haulage.* (41) July.
The New Dock and Warehouses at Manchester, England.* (78) Serial beginning July.
Construction of Coffer-Dams. Thomas P. Roberts. (58) July.
Methods of Subaqueous Rock Excavation, Buffalo Harbor, N. Y.* (13) July 6.
The Salvage of the Dredger *Walter Bibby*. (11) July 14.
On the Stability of Masonry Dams.* Karl Pearson. (11) July 14.
Failure of a Concrete Sea-Wall.* George W. Blodgett. (15) July 21.
An Electrical Long-Distance Water-Level Indicator.* (19) July 22.
The Panama Canal: Some Serious Objections to the Sea Level Plan.* Cassius E. Gillette. (13) July 27.
Pile Foundation for Movable Dam, at McMechen, W. Va., with Method of Calculation.* Gilbert S. Walker, M. Am. Soc. M. E. (13) July 27.
Building the Beachy Head Lighthouse.* (14) July 29.
Oscillations des Tours de Phares.* M. Ribiere. (43) 1er Trimestre.
Murs de Quai Récemment Construits à Nice et à Cannes.* M. Bourgougnon. (43) 1er Trimestre.
Les Travaux Publics en 1905 à la Guyane Francaise.* Joseph Deydier. (32) Feb.
Le Port de Buenos-Aires et Ses Agrandissements. Auguste Moreau. (32) Apr.
Le Canal de Panama: Historique des Deux Compagnies Françaises et de la Vente de la Concession aux États-Unis.* A. Dumas. (33) Serial beginning May 6.
Le Port d'Anvers: Construction des Quais de l'Escaut a Anvers (Sud): Résultats de Quelques Expériences sur les Bétons mis en Œuvre.* M. Zanen. (30) June.

* Illustrated.

Waterways—(Continued).

Ueber Schutzbauten zur Erhaltung der Ost- und Nordfriesischen Inseln.* Fulscher. (49) Pt. 4-6, 1905.

Vorarbeiten für Flussregelungen und Talsperren. Fuhrmann. (49) Pt. 4-6, 1905.

Der Einschnitt bei Grünenthal.* Friedr. Ludecke. (81) Pt. 1, 1905.

Die Verwertung des Retentionsvermögens der Salzkammergut-Seen zur Milderung der Hochwassergefahren im Traungebiete. Ernst Landa. (53) Serial beginning Apr. 28.

Betriebsergebnisse über das Entleeren von Schlämmbassins und Klärteichen mittels Baggermaschinen.* Kosmann. (Paper read before the Deutscher Verein für Ton-, Zement- und Kalk-industrie.) (80) June 1.

Der Sondiertachygraph (Patent: Ing. Reich-Ganser).* Rudolf Reich. (53) Serial beginning June 16.

Der Elektrische Teil des Preisgekrönten Schiffshebewerk-Projektes "Universell." Josef Rothmüller. (53) Serial beginning June 30.

Berechnung der Grössten Sekundlichen Hochwassermengen aus dem Niederschlagsgebiet und der Anlaufzeit der Flutwelle.* Adolf Specht. (51) July 15.

Die Nutzbarmachung der Flossbäche des Frankenwaldes für die Flussschiffahrt, Industrie und Landwirtschaft durch Anlage von Talsperren. Fischer. (Paper read before the Verein für Hebung der Fluss- und Kanalschiffahrt in Bayern. (51) July 22.

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* Illustrated.

AMERICAN SOCIETY OF CIVIL ENGINEERS.
INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

September 6th, 1905.—The meeting was called to order at 8.35 P. M.; President C. C. Schneider in the chair; Chas. Warren Hunt, Secretary; and present, also, 106 members and 23 guests.

The minutes of the meetings of June 7th, and of the Annual Convention, June 20th to 23d, 1905, were approved as printed in the *Proceedings* for August, 1905.

A paper by Edwin H. Warner, M. Am. Soc. C. E., entitled "The Hydraulic Plant of the Puget Sound Power Company," was presented by the Secretary, who also read a communication on the subject by William S. Post, Assoc. M. Am. Soc. C. E. Mr. Hunt also read communications on this paper from J. H. Cunningham and A. L. Adams, Members Am. Soc. C. E., which had been presented at the second meeting of the San Francisco Local Association of Members.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

Ernest William Branch, Quincy, Mass.
Alfred Samuel Burgess, New York City.
Hugh Lincoln Cooper, New York City.
Frank Leslie Davis, Tacoma, Wash.
Charles Edward Gordon, Lawton, Okla.
Edward Bennet Gumaer, Jersey City, N. J.
David Edward Hughes, San Pedro, Cal.
William Frederick Kauffmann, East Rutherford, N. J.
Robert Stevens Parsons, Cleveland, Ohio.
William Anson Pearson, Jr., Schenectady, N. Y.
Samuel Bostwick Robbins, Great Falls, Mont.
Samuel Moorhead Russell, Peoria, Ill.
Edward Howard Sapp, Camden, N. J.
Francis Edward Snyder, Chicago, Ill.
DeWitt Clinton Webb, Philadelphia, Pa.
Alvinus Brier Wood, Cottage Grove, Ore.

As Associate Members.

John Walter Ackerman, Auburn, N. Y.
Clarence Edson Alderman, Worcester, Mass.
William James Boucher, New York City.
William Lowe Brown, New York City.
Joseph Patrick Carlin, New York City.
Jacob Centennial Clausen, Yuma, Ariz.
Charles Benedict Grady, New York City.
Samuel Whilden Henderson, Durango, Colo.
Ernest Emmanuel Howard, Kansas City, Mo.
Adam Hunter, London, England.
Paul Alois Kirchner, Richmond, Va.
John Howard Lewis, Salem, Ore.
Samuel Alexander McCoy, Fordyce, Ark.
William Sheppard Manning, Jr., Syracuse, N. Y.
Curtis Adolph Mees, Charlotte, N. C.
Walter Henry Norris, Boston, Mass.
Charles Edward Quinby, Ludlow, Mass.
Arthur Winthrop Sargent, Fort Flagler, Wash.
Wilbur Cyrus Sawyer, Pendleton, Ore.
George Edson Philip Smith, Tucson, Ariz.
John Truesdale Stewart, Washington, D. C.
John Stockton, Hoboken, N. J.
Jesse Russell Taft, New York City.

As Associate.

James Francis Wrenn, Batesville, Ind.

The Secretary announced:

The transfer of the following candidates, by the Board of Direction, on September 5th, 1905:

From Associate Member to Member.

Charles Worthington Comstock, Denver, Colo.
James Welch Frazier, Cleveland, Ohio.
Joseph Henry O'Brien, New York City.
Julian Thornley, Niagara Falls, Ont., Canada.
Oscar Holmes Tripp, Rockland, Me.

The election of the following candidates, by the Board of Direction:

As Juniors.

On June 6th, 1905.

Eugene Harry Bruntlett, Cape May, N. J.
Dwight Fred Horton, San Marcos, Tex.
Robert Mackinlay Smith, Bedford, Ohio.

On September 5th, 1905.

Hunley Abbott, New York City.
Joseph Brady, New York City.
Frank Wesley Cooper, St. Louis, Mo.
Arthur James Decker, Columbus, Ohio.
Henry Bernardin Drowne, Providence, R. I.
Sidney Twichell Harding, Ann Arbor, Mich.
Smith Tompkins Henry, New York City.
Rodney Hitt, New York City.
Burt Bradley Hodgman, New York City.
Frank Ray Lanagan, Albany, N. Y.
Henry Leeuw, New York City.
Johannes Adrianus de Lint, The Hague, The Netherlands.
Edgar Staples Maupin, Macon, Mo.
Melvin S. Rich, Wilmington, Del.
Horace West Sheley, Spanish Fork, Utah.
Thomas William Rostad Teigen, Traskwood, Ark.
Le Baron Turner, Geneva, Ill.
George William Carlyle Whiting, Catonsville, Md.

The Secretary announced the following deaths:

GEORGE CLIFTON WOOLLARD, elected Junior April 3d, 1900; died June 3d, 1905.

JOHN TALCOTT NORTON, elected Member November 3d, 1897; died August 5th, 1905.

Adjourned.

September 20th, 1905.—The meeting was called to order at 8.30 P. M.; President Schneider in the chair; Charles Warren Hunt, Secretary, and present, also, 79 members and 16 guests.

A paper, entitled "Notes on the Improvement of River and Harbor Outlets in the United States," by D. A. Watt, M. Am. Soc. C. E., was presented by the Secretary, who also read discussions by L. J. Le Conte, M. Am. Soc. C. E., and W. W. Harts, M. Am. Soc. C. E.

The Secretary announced the death of ARCHER COCHRAN STITES, elected Junior December 3d, 1890; Assoc. M., November 4th, 1891; Member, May 6th, 1898; died August 27th, 1905.

Adjourned.

CORRECTION OF THE MINUTES.

Before final paragraph, page 265 (August *Proceedings*) insert "A resolution was adopted expressing the thanks of the Society to Secretary Hunt, for his arduous labor in connection with the work of the Engineering Congress, and its appreciation of the manner in which that work was done."

OF THE BOARD OF DIRECTION.

(Abstract.)

September 5th, 1905.—President Schneider in the chair; Chas. Warren Hunt, Secretary, and present, also, Messrs. Bissell, Bowman, Croes, Ellis, Knap, N. P. Lewis, Moore and Osgood.

A communication was received from the Secretary of the Nominating Committee giving a list of the nominees selected to fill offices which will be vacant on January 17th, 1906.

Applications were considered, and other routine business transacted.

Five Associate Members were transferred to the grade of Member, and eighteen candidates for Junior were elected.

Adjourned.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, October 4th, 1905.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and two papers will be presented for discussion, as follows: "Some Specialties of the System for Flushing the New Sewers of the City of Mexico," by Roberto Gayol, M. Am. Soc. C. E., and "The Walworth Sewer, Cleveland, Ohio," by Walter C. Parmley, M. Am. Soc. C. E.

Both these papers were printed in the August number of *Proceedings.*

Wednesday, October 18th, 1905.—8.30 P. M.—At this meeting a paper entitled "An Example of the Legitimate Use of Water for Domestic Purposes," by K. F. Cooper, Jun. Am. Soc. C. E., will be presented for discussion.

This paper was printed in the August number of *Proceedings.*

Wednesday, November 1st, 1905.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper entitled "The Theory of Frameworks with Rectangular Panels, and its Application to Buildings which have to Resist Wind," by Ernst F. Jonson, Assoc. M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings.*

PRIVILEGES OF LOCAL SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

The Boston Society of Civil Engineers will welcome any member of the American Society of Civil Engineers at its library and reading room, 715 Tremont Temple, Boston, which is open on week days from 9 A. M. to 5 P. M. Members will also be welcome at the meetings, which are held in the same building, on the evenings of the fourth Wednesday in January, and the third Wednesdays of other months, except July and August.

The rooms of **The St. Louis Engineers' Club** are in the business center of St. Louis, and visiting engineers are cordially invited to use them for mail, telephone service, information, etc.

The courtesies of **The Engineers' Society of Western Pennsylvania** have been extended to members of the American Society of Civil Engineers. The rooms of the Society, 410 Penn Ave., Pittsburg, Pa.,

are open at all times, and meetings are held as follows, except during July and August. Regular Section, Third Tuesdays; Chemical Section, Thursdays following third Tuesdays; Mechanical Section, First Tuesdays; Structural Section, Fourth Tuesdays.

The Western Society of Engineers, Monadnock Block, Chicago, Ill., tenders to members of this Society the use of its rooms and facilities, together with the good offices of its Secretary and of a special committee appointed for that purpose.

The Civil Engineers' Club of Cleveland, Ohio, invites members of this Society to make use of the Club rooms, at any time when in Cleveland. Cards will be furnished on application to the Secretary, Mr. J. C. Beardsley.

The Engineers' Club of Central Pennsylvania has established new quarters at the corner of Second and Walnut Streets, Harrisburg, Pa., and desires to extend the courtesies of the Club to visiting members of the American Society of Civil Engineers.

The Engineers' and Architects' Club of Louisville, Ky., cordially invites members of the American Society of Civil Engineers, visiting Louisville, to make use of its library and rooms, 303 Norton Building, Fourth and Jefferson Streets. The rooms are open on week days during business hours.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

It is proposed to publish here, from time to time, information relating to Local Associations of Members of the American Society of Civil Engineers. An account of the first meeting of the San Francisco Association appeared in *Proceedings* for August, 1905, pages 279 and 280.

San Francisco, Cal., August 19th, 1905. (Abstract.)

The second regular meeting of the San Francisco Association of Members of the American Society of Civil Engineers was held at the Palace Hotel, San Francisco, at 8 P. M., at the conclusion of an informal dinner. Twenty-three members and five guests were present.

The minutes of the preceding meeting were read and approved.

Captain Harts addressed the meeting concerning the objects and aims of the Association.

Mr. A. L. Adams also spoke on the desirability of members presenting papers describing the work they are doing, and of younger members making it their aim to contribute something to the literature of the Profession.

The Secretary reported that the amendment to Article 11 of the Constitution had carried, the entire number of ballots (47) having been in the affirmative.

It was reported by the Secretary that the Board of Directors had found it advisable to establish the following rule for controlling discussions, *viz.*, that preference be given to discussions submitted in writing; that written discussions requiring more than fifteen minutes for presentation be given in abstract; that oral discussions be limited to five minutes for each person, and that the same person shall not be heard twice at any meeting on the same subject, unless in response to direct questions.

The following recommendation by the Board of Directors was adopted:

That the President and Secretary be authorized to invite to any Association dinner or meeting, as guests of the Association, visiting members of the American Society of Civil Engineers, providing they do not reside less than 100 miles from San Francisco.

Mr. A. L. Adams presented a written discussion of the paper entitled "The Hydraulic Plant of the Puget Sound Power Company," by Edwin H. Warner, M. Am. Soc. C. E., published in the May *Proceedings* of the Society.

The Secretary read a discussion by Mr. J. L. Le Conte of the paper entitled "Notes on the Improvement of River and Harbor

Outlets in the United States," by D. A. Watt, M. Am. Soc. C. E., published in the May *Proceedings* of the Society. A written discussion of this paper was also presented by Captain W. W. Harts. The paper was further discussed orally by Mr. H. C. Phillips, Professor Soule and Captain Harts.

ACCESSIONS TO THE LIBRARY.

From August 3d to September 12th, 1905.

DONATIONS.*

CALCAREOUS CEMENTS,

Their Nature and Uses. By Gilbert R. Redgrave and Charles Spackman. Second and Revised Edition. Cloth, 9 x 7 in., illus., 18 + 310 pp. London, Charles Griffin and Company, Limited, 1905. $4.50.

The preface states that since the first edition was written important changes have taken place in the cement industry, due to the introduction of the rotary kiln and the tube-mill. Nearly all the plant which was regarded as essential ten years ago has become obsolete, and the processes of manufacture have undergone such a complete revolution that it has become necessary to rewrite entire chapters descriptive of the appliances in common use at that date. The authors have attempted to give the altered methods in the production of Portland cement, an account of the most recent processes adopted in England, the United States and on the Continent, and to place on record some of the theories of cement reactions which have been promulgated by English and foreign experimenters, thus adding considerably to the former Chapter on the Analysis of Cement Mixtures. The work is intended to be useful in both the laboratory and the manufactory. There is an index of twelve pages.

STEAM ENGINEERING;

A Treatise on Boilers, Steam, Gas and Oil Engines and Supplementary Machinery. By W. W. F. Pullen. Second Edition, Revised and Enlarged. Cloth, 9 x 6 in., 454 pp., illus. Manchester, Scientific Publishing Co. 4 shillings net.

It is stated in the preface that in the second edition the author has added a considerable number of illustrations to the chapters dealing with descriptive matter, notably in connection with the marine engine, the internal combustion engine, and the steam turbine. For lack of space, no attempt has been made to give any historical summary of the development of the steam engine, the work treating of the machine as it exists at the present time. There is an index of five pages.

L'INDUSTRIE AURIFÈRE,

Par David Levat. Paper, 10 x 6 in., 16 + 899 pp. Paris, Vve. Ch. Dunod, 1905. 30 francs.

It is stated that an attempt is made to embrace in one work the entire subject of gold industry, giving a comparison of different methods, making known their characteristic traits, and drawing conclusions applicable to the treatment of the most varied and complex gold-bearing minerals. The discussion of mining affairs in France, as well as in England, and the opinion on the duration of the mines of the Transvaal and Australia is intended to give capitalists and financiers an opportunity of judging of gold affairs, independently of speculations on the Bourse. Special chapters are devoted to the study of the latest novelties, notably to the use of Tube-Mills which, it is stated, allow of doubling the capacity of the Californian mills. The introduction treats of considerations of gold mines in general and the properties of gold. The first part on extraction of gold from minerals treats of auriferous alluvium, prospecting and methods of working. The second part on gold veins, in two chapters, treats of auriferous quartz with free milling ores and quartz containing refractory ores. Part three contains monographs on types of installation. There is an alphabetical index of eighteen pages.

HYGIÈNE ET SÉCURITÉ DU TRAVAIL INDUSTRIEL.

Par Georges G. Paraf. Paper, 10 x 6 in., illus., 7 + 632 pp. Paris, Vve. Ch. Dunod, 1905. 20 francs.

The preface states that the purpose of this work is a complete study of the sanitary conditions of manufacturing; that the author has taken his examples

*Unless otherwise specified, books in this list have been donated by the publishers.

from some of the best establishments in France and foreign countries, and thus attempted to show the latest perfected usages for the hygiene and safety of the laborer. Among the establishments described are those of Sèvres, Delauny-Belleville, Schneider, Appert, Menier, Weyher and Richemond, Darracq, in France; and Krupp, L. Loewe, Pintsch, Siemens, Cockerill, Colville, Sturtevant, Richard, Escher Wyss, Sulzer, etc., in other countries. It is stated that while adhering to the technical questions, which are brought together in general groups, the author also touches the medical and judicial side. An appendix gives laws, decrees and decisions on labor in France. It is stated that the medical part has been treated as much from the point of view of the hygiene of the workshop as of the workman himself. This last question is of immediate interest, because it will be the basis of future legislation on the workman. There is a subject index and an index of illustrations, the two covering fifteen pages.

GEOLOGY OF WESTERN ORE DEPOSITS.

By Arthur Lakes. New Edition, re-written and enlarged. Cloth, 8 x 6 in., 438 pp., illus. Denver, The Kendrick Book and Stationery Company, 1905. $2.50 net.

It is stated in the preface, that it has been the writer's object to illustrate the principles of mining geology rather than to dilate on any particular rich or noted mine. If a small mine illustrates some important geological or other interesting feature in the science of mining, attention is given to that mine rather than to its more noted neighbor. Preference is given to Colorado's mines because the writer is more familiar with them, and they well illustrate the leading principles. Those outside of Colorado are selected and described as enlarging on principles previously discussed. The first part of the book relates to general features of mining geology. This is followed by illustrations drawn from Colorado mining camps and others of the Western States. There is an index of fourteen pages.

CEMENT, LIMES AND PLASTERS;

Their Materials, Manufacture and Properties. By Edwin C. Eckel, Assoc. Am. Soc. C. E. Cloth, 9 x 6 in., 34 + 712 pp., illus. New York, John Wiley & Sons, 1905. $6.

The preface states that this volume is the result of an attempt to provide a summary of the subject from an American point of view, covering the composition and character of the raw materials, the methods of manufacture, and the properties of the various cementing materials. Reference lists have been placed in almost every chapter of this volume. These lists contain the names of some papers and articles published in European periodicals or transactions, but most of the titles cited will be found in American journals. It is stated that stress has been laid, in the discussion of manufacturing methods, on the general chemical and physical principles which underlie these methods rather than on the details which differ at every plant and may change with every year. So far as possible it is stated such details as bear on labor, power and costs have been discussed. The contents are: Part I, Plasters; Part II, Limes; Part III, Magnesia and Oxychloride Cements; Part IV, Hydraulic Limes, Selenitic Limes, and Grappier Cements; Part V, Natural Cements; Part VI, Portland Cement; Part VII, Puzzolan Cements. There is an index of twenty-two pages.

THE BERLIN-ZOSSEN ELECTRIC RAILWAY TESTS OF 1903;

A report of the Test Runs Made on the Berlin-Zossen Railroad in the Months of September to November, 1903. Translated from the German by Franz Welz; with an Introduction Discussing the General Subject of Train Resistance, by Louis Bell. Cloth, 11 x 8 in., 16 + 99 pp., illus. New York, McGraw Publishing Company, 1905. $3.

The introduction states that the points at issue in the Berlin-Zossen experiments were, the feasibility of adequate power supply to a moving train at high speed; the determination of the actual power required at such speeds and the construction of roadway and rolling-stock required to make such speeds mechanically secure. These tests were carried on by the "Studiengesellschaft" on the Military Railroad and it is stated they were enabled to make exact measurements and gather data regarding high-speed service. This book contains an account of the preparations for the tests; the improvement of the

road and the rolling-stock; and of some new measuring instruments; and also describes the method of procedure and gives the results of test runs. There is no index.

COKE;

A Treatise on the Manufacture of Coke and other Prepared Fuels and the Saving of By-Products. By John Fulton. Cloth, 9 x 6 in., 14 + 476 + 22 pp., illus. Scranton, International Textbook Company, 1905. $5.

It is stated in the preface that the interval of nine years since the appearance of the first edition has retired some of the former methods of the manufacture of coke, and introduced many new ones. The book contains chapters on The Coal Fields of North America; The Formation and Chemical Properties of Coal; Preparation of Coals for the Manufacture of Coke; History and Development of the Coke Industry; Manufacture of Coke; Retort and By-Product-Saving Coke Ovens; Physical Properties of Charcoal, Anthracite, and Coke, and a Comparison of Beehive and By-Product Coke; The Laboratory Methods of Determining the Relative Calorific Values of Metallurgical Fuels; The Locating of Plants for the Manufacture of Coke; General Conclusions on the Work, Cost, and Products of the Several Types of Coke Ovens; The Fuel Briqueting Industry. There is an index of almost eight pages.

HYDRAULIC TABLES;

Showing the Loss of Head due to the Friction of Water Flowing in Pipes, Aqueducts, Sewers, etc., and the Discharge over Weirs. By Gardner S. Williams, M. Am. Soc. C. E., and Allen Hazen, M. Am. Soc. C. E. Cloth, 9 x 6 in., 3 + 75 pp. New York, John Wiley & Sons, 1905. $1.50.

It is stated in the introduction that these tables show the flow of water in pipes and other passages, as computed by the Hazen-Williams hydraulic slide-rule, based upon a formula used by the authors for some time. A specially constructed slide-rule was prepared. All the computations of figures contained in this volume, except a few fundamental ratios, have been made with this, and, it is stated, only such accuracy has been sought as can be readily obtained by this method. The book treats of the Formula Used; Increasing Friction with Age, how Computed, and Indicated in the Tables; Observations of Flow in Cast-Iron Pipe, Riveted-Steel Pipe, Wooden-Stave Pipe, Rectangular Wooden Pipe, Cement Pipe, Wrought-Iron Pipe, Galvanized-Iron Pipe, Brass Pipe, Lead Pipe, Glass Pipe, Fire-hose, Open Conduits, Aqueducts, Brick Sewers, Canals; Table of Flow in Small Brass Pipes, Wrought-Iron Pipes, Hose and Pipes, Pipes from 4 in. to 144 in. in Diameter; Relative Discharging Capacity and Table of Flow in Aqueducts; Sewers, Table of Slopes Required to Produce Certain Velocities; Tile Sewer Table; Circular Brick Sewer Table; Decrease in Carrying Capacity of Cast-Iron Pipe with Age; Comparison of Results with those of Coffin and Weston; Metric Pipe Table; Loss of Head in Venturi Meter; Underdrains for Sand-Filters; Flow over Weirs.

GEOLOGY APPLIED TO MINING;

A Concise Summary of the Chief Geological Principles, a Knowledge of which is Necessary to the Understanding and Proper Exploitation of Ore-Deposits for Mining Men and Students. By Josiah Edward Spurr. Cloth, 8 x 6 in., 13 + 326 pp. New York, The Engineering and Mining Journal, 1904. $2.

The preface states that the author attempts in the present volume to give concisely the results of the science of geology bearing upon ore-deposits. In preparing this work, it is stated, two points have been kept in mind; first to make statements as clear as possible, considering the technical nature of the subject; and second to present the scientific facts accurately, and as fully as absolutely necessary. Simplicity of language has been constantly striven after. The book contains: The Processes of Ore-Deposition; The Study of the Arrangement of the Stratified Rocks as Applied to Mining; The Study of Igneous Rocks as Applied to Mining; The Study of Dynamic and Structural Geology as Applied to Mining; The Study of Chemical Geology as Applied to Mining; The Relation of Physiography to Mining. There is an index of fourteen pages.

REPORT OF JOSEPH L. BRISTOW.

Special Panama Railroad Commissioner to the Secretary of War, June 24, 1905. Published by Office of Administration, Isthmian Canal Affairs. Paper, 9 x 6 in., 557 pp. Washington, 1905.

This is a report on the policy which the Government should pursue in regard to the steamship lines connecting with the Panama Railroad. In addition to the report by Mr. Bristow, it contains many valuable appendices giving the treaties and contracts relating to the Panama Railroad, and reports from shippers on the western coasts of North and South America, and the eastern coast of the United States.

WIRELESS TELEGRAPHY;

Its History, Theory and Practice. By A. Frederick Collins. Cloth, 9 x 6 in., illus., 11 + 299 pp. New York, McGraw Publishing Company, 1905. $3.

It is stated in the preface that since it frequently happens that didactic treatises fall into the hands of the untaught, and that the simplest of texts are sometimes found useful by the specialist, it is proposed that all the various phases of the subject under consideration should receive due attention, and, by connecting them in a series, a complete and logical account would necessarily follow and bring the state of the art down to the present time. For this reason a brief historical retrospect takes precedence at the beginning of nearly every chapter, and then follow the theoretical deductions, experimental physics, and, finally, the practical workings are given. The contents are: Ether; Wave Motion; Electric Waves; Disruptive Discharge; Electric Oscillations; Oscillators; Capacity, Inductance and Resistance; Mutual Induction; Induction Coils; Interruptors; Oscillating Current Generators; Electric Wave Action; Electric Wave Detectors; Transmitters; Receptors; Subsidiary Apparatus; Aerial Wires and Earths; Resonance; Syntonization; Wireless Telephony. There is an Index to Names of two pages.

Gifts have also been received from the following:

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Western New York Car Service Assoc. 1 pam.
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BY PURCHASE.

Sir Henry Bessemer, F. R. S., an Autobiography with a Concluding Chapter. London, Offices of *Engineering*, 1905.

American Telephone Practice. By Kempster B. Miller. Fourth Edition, Enlarged and Entirely Rewritten. New York, McGraw Publishing Company, 1905.

American Street Railway Investments, Published Annually by the *Street Railway Journal*, for the Use of Bankers, Brokers, Capitalists, Investors and Street Railway Companies. Eleventh and Twelfth Annual Volumes, 1904–05. New York, The McGraw Publishing Company.

Sewerage and Sewage Purification. By M. N. Baker. Second Edition, Revised and Enlarged. New York, D. Van Nostrand Company, 1905.

Mechanics of Air Machinery. By Julius Weisbach and Gustav Herrmann. Authorized Translation with an Appendix on American Practice, by Amasa Trowbridge. New York, D. Van Nostrand Company, 1905.

Bacteriology and the Public Health. By George Newman. Third Edition. Philadelphia, P. Blakiston's Son & Co., 1904.

Technische Messungen, insbesondere bei Maschinenuntersuchungen zum Gebrauch in Maschinenlaboratorien und für die Praxis. Von Anton Gramberg. Berlin, Julius Springer, 1905.

Annual Report of the Reclamation Service, 1st–2d; with Maps to Accompany First Annual Report. United States Geological Survey. 3 vols. Washington, Government Printing Office, 1903–04.

American Tool Making and Interchangeable Machinery. By Joseph V. Woodworth. New York, The Norman W. Henley Publishing Co., 1905.

Gold Dredging in California. Bulletin No. 36, California State Mining Bureau. Lewis E. Aubury, State Mineralogist. Sacramento, 1905.

Report of the Royal Commission Appointed to Inquire into and Report Upon the Means of Locomotion and Transport in London. London, Wyman & Sons, 1905.

SUMMARY OF ACCESSIONS.

August 3d to September 12th, 1905.

Donations (including 12 duplicates)	278
By purchase	13
Total	291

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ADDITIONS.

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DEATHS.

NORTON, JOHN TALCOTT. Elected Member, November 3d, 1897; died August 5th, 1905.

STITES, ARCHER COCHRAN. Elected Junior, December 3d, 1890; Associate Member, November 4th, 1891; Member May 6th, 1896; died August 27th, 1905.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(August 4th to September 9th, 1905.)

NOTE.—*This list is published for the purpose of placing before the members of the Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings*, Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
(7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine*, New York City, 25c.
(10) *Cassier's Magazine*, New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News*, New York City, 15c.
(14) *The Engineering Record*, New York City, 12c.
(15) *Railroad Gazette*, New York City, 10c.
(16) *Engineering and Mining Journal*, New York City, 15c.
(17) *Street Railway Journal*, New York City. Issues for first Saturday of each month 20c., other issues 10c.
(18) *Railway and Engineering Review*, Chicago, Ill., 10c.
(19) *Scientific American Supplement*, New York City, 10c.
(20) *Iron Age*, New York City, 10c.
(21) *Railway Engineer*, London, England, 25c.
(22) *Iron and Coal Trades Review*, London, England, 25c.
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Hoisting Practice in the Pennsylvania Anthracite Region.* R. V. Norris. (9) Sept.
The Trnesdale Plant.* (16) Serial beginning Sept. 2.
The Bengal Coal-Fields of India.* George A. Stonier. (Abstract of Paper in *Trans.* of the Inst. of Min. Eng.) (16) Sept. 9.

Miscellaneous.

The Practical Utility of Manual and Technical Training. Wm. Barclay Parsons. (Address before the Nat. Educational Assoc.) (14) Aug. 12; (62) Serial beginning Aug. 31.
The Production and Utilization of Ozone. Arthur W. Ewell. (27) Aug. 12.

Municipal.

Some Unusual Experience with Asphalt Pavements.* (14) Aug. 5.
Municipal and Company Operation (gas works). (83) Aug. 15.
Motor (street) Sprinkler at Cologne.* (46) Sept. 2.
La Corniche de l'Estérel. M. Thérel. (43) 2e Trimestre, 1905.
Über Ölbesprengung von Strassen. F. Drobny. (53) Aug. 4.
Krümmungshalbmesser und Breite der Strassenwendeplätze. F. Loewe. (53) Aug. 25.

Railroad.

Methods of Location on the Choctaw, Oklahoma and Gulf Railroad.* F. Lavis, Assoc. M. Am. Soc. C. E. (54) Vol. 54.
Railway Construction in North China.* Edward Hulme Rigby and William Orr Leitch, Jnn., Assoc. MM. Inst. C. E. (63) Vol. 160.
Standard Specifications for Cast-Iron Car-Wheels. Charles B. Dudley. (56) Vol. 35.
Notes on Rail-Steel. Robert W. Hunt. (56) Vol. 35.
The Development of the Single-Phase Railway System.* (11) July 28.
Traverser for the Western Railway of France.* (11) July 28.
The Nerves of a Railway; Block Signalling Systems on American Railways.* Day Allen Willey. (10) Aug.
2-6-2, or "Prairie" Type Express Engine; Lake Shore and Michigan Southern R. R.* (21) Aug.
Enlarging and Remodelling at Victoria Station: London, Brighton and South Coast Railway.* Chas. S. Lake. (21) Aug.
Ten Wheel Switcher for the Lake Shore.* (39) Aug.
Central Vermont Two-Cylinder Compound.* (39) Aug.
Machine for Loading Box Cars with Coal.* (13) Aug. 3.

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Railroad—(Continued).

Details of Argentine Locomotives.* (11) Aug. 4.
Schenectady Balanced Compound Locomotive for the Erie.* (40) Aug. 4.
Delaware & Hudson Composite Coal Car.* (40) Aug. 4.
Tests of Superheater Locomotives by the Belgian State Railways.* (40) Aug. 4.
Balanced Compound Locomotive for the New Zealand State Railways.* (40) Aug. 4.
The Creeping of Rails on Railroads. N. Benjamin. (40) Aug. 4.
Recent Developments in Three-Phase Traction on the Valtellina Road.* (27) Aug. 5.
The Use of Superheated Steam on Locomotives.* H. H. Vaughan. (Abstract of Paper read before the Amer. Ry. Master Mechanics' Assoc.) (47) Serial beginning Aug. 5.
A Large Locomotive Boiler.* (From *Amer. Engr. and R. R. Journal.*) (47) Aug. 5.
New Electric Locomotives for the Valtellina Railway.* Bela Valatin. (17) Aug. 5.
Brake Shoe Tests. (Report of Standing Com. to the M. C. B. Assoc.) (18) Aug. 5.
Pacific Type Passenger Locomotive with Superheater, C., R. I. & P. Ry.* (18) Aug. 5.
Signalling on the Southern Pacific System. E. M. Cutting. (Abstract of Paper read before the Pacific Coast Ry. Club.) (18) Aug. 5.
Freight Yard Air-Brake Testing Plant, C., B. & Q. Ry.* (18) Aug. 5.
The Terminal Railroad Improvements at St. Louis.* (14) Aug. 5.
The Barrientos Tunnel, Mexico.* C. Gordon Paterson. (13) Aug. 10.
Electric Headlight for Locomotives.* (13) Aug. 10.
Crossing Frog with Continuous Rails.* (13) Aug. 10.
Thomas's Central Automatic Buffer-Coupling.* (11) Aug. 11.
150 000-lb. Flat Cars for the Pittsburg & Lake Erie.* (15) Aug. 11; (39) Sept.
English Motor Cars.* (15) Aug. 11.
Reinforced Concrete Passenger Tunnel: C. R. R. of N. J.* (15) Aug. 11.
The North-Western's New Line to Milwaukee.* (15) Aug. 11.
Electric Plant for Fixing Rails and Packing Permanent Way.* (11) Aug. 11; (62) Aug. 31.
Pennsylvania Terminal Work in New York.* (40) Aug. 11.
Improvements to a Toledo Road.* (17) Aug. 12.
High-Power English Gasoline Motors for Driving American Locomotives.* (19) Aug. 12.
Balanced Compound Locomotive, Erie R. R.* (18) Aug. 12.
The Combined Automatic and Straight-Air Brake. R. H. Blackall. (Paper read before the New England R. R. Club.) (18) Aug. 12.
Oil Furnaces and Oil Fuel for Locomotives, Southern Pacific Co. Stephen Uren. (Paper read before the Pacific Coast Ry. Club.) (18) Aug. 12.
Electricity as Applied to Steam Railroads. A. H. Armstrong. (From an Address before the Richmond R. R. Club.) (18) Aug. 12.
The Tabor-Bechyne (Austria) Interurban Line.* (72) Aug. 15.
Concerning Retaining Walls and Earth Pressures.* H. P. Boardman. (13) Aug. 17.
Concrete Ties on the Lake Shore & Michigan Southern Ry.* (13) Aug. 17.
Covered Goods Wagons for Japanese Railways.* (15) Aug. 18.
Henri Four-Cylinder Compound Express Locomotives: Paris, Lyons & Mediterranean Railway.* F. C. Coleman. (40) Aug. 18.
Heating the Rock Island Smithshop at Moline, Ill.* (40) Aug. 18.
North-Eastern Locomotive Works, Darlington.* (12) Aug. 18.
Locomotives at the Liége Exhibition. H. W. Hanbury, A. M. Inst. C. E. (11) Serial beginning Aug. 18.
Ten-Wheel Locomotive with Superheater, C., St. P., M. & O. Ry.* (18) Aug. 19.
Hollow Firebrick Arch for Locomotives on Chicago & Northwestern Railway.* (13) Aug. 24.
The Carnegie Steel Tie.* (13) Aug. 24.
Standard Designs of Locomotives for India. (13) Aug. 24.
Lackawanna's Eastern Terminal at Hoboken.* (40) Aug. 25.
Denver & Rio Grande Station at Grand Junction, Colo.* (40) Aug. 25.
D., L. & W. Improvements at Newark, N. J.* (15) Aug. 25.
Tank Cars for the Argentine Government Railways.* (15) Aug. 25.
Steam Coach: Great North of Scotland Railway.* (11) Aug. 25.
New Bogie Tank Engines, South-Eastern and Chatham Railway.* (12) Aug. 25.
New Westinghouse Electric Locomotive.* (27) Aug. 26.
Construction of the Pocahontas Tunnel, New York Central R. R.* (14) Aug. 26.
Some Factors in British Locomotive Design.* Chas. S. Lake. (47) Serial beginning Aug. 26.
Inspection Locomotive, New York Central Lines.* (18) Aug. 26.
Signals in Snow Sheds, Southern Pacific Co.* (18) Aug. 26.
The Rhodesia Railways, Limited.* (14) Serial beginning Aug. 26.
Base Line Measurements for the Pennsylvania R. R. Tunnels at New York. (14) Aug. 26.

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The St. Gall-Speicher-Trogen Electric Railway.* Henri Somach. (17) Aug. 26.
The New Hampshire Traction Company's Portable Sub-Station.* (17) Aug. 26.
Operating Results of the Valtellina Railway: Peculiarities of the Three-Phase Traction. Eugen Cserhati. (17) Aug. 26.
The Brake-Shoe Problem. (17) Aug. 26.
New Metropolitan Railway Locomotives.* (17) Aug. 26.
75-Ton Steel Flat Car: Pittsburgh & Lake Erie Railroad.* (25) Sept.
Atlantic Type Passenger Locomotive with Superheater: Chicago, Rock Island & Pacific Railway.* (25) Sept.
Heavy Switching Locomotive: New York Central Lines.* (25) Sept.
Superheating Ten-Wheel Engine: C., St. P., M. & O. Ry.* (39) Sept.
Westinghouse Single-Phase Railway System.* Clarence Renshaw. (Abstract of Article in *Electric Club Journal.*) (39) Sept.
Under-Running Third Rail for the New York Central.* (15) Sept. 1; (40) Sept. 1; (14) Sept. 2; (17) Sept. 2.
A Novel Train-Shed for the New Hoboken Terminal of the Lackawanna.* (15) Sept. 1.
A Steel Flat Car of 150 000 Pounds Capacity.* (40) Sept. 1.
The New Reinforced Concrete Shops and Car Houses of the Central Pennsylvania Traction Company at Harrisburg, Pa.* (17) Sept. 2.
Equipment of the New Plank Road Car Shops of the Public Service Corporation.* Martin Schreiber. (17) Sept. 2.
Track Elevation on the Chicago & North-Western Ry., Chicago.* (13) Sept. 7.
Car Wheel Forging.* James H. Baker. (20) Sept. 7.
New Freight Yard of the Burlington at Galesburg.* (15) Sept. 8.
The Montreux-Oberland-Bernois Railroad.* Frank C. Perkins. (15) Sept. 8.
Étude sur la Stabilité des Trains et les Chemins de Fer à Voie de $0^{m},60$.* M. Pechot. (Lecture delivered before the Élèves-Ingénieurs des Ponts et Chaussées et des Mines.) (43) 2e Trimestre, 1905.
Note sur Divers Travaux d'Infrastructure de la Ligne d'Étampes à Pithiviers.* M. Lorieux. (43) 2e Trimestre, 1905.
Les Tunnels Tubulaires en Terrains Aquifères: La Traversée sous la Seine des Nouvelles Lignes du Métropolitain.* C. Birault. (32) June.
Traverses de Chemin de Fer en Acier Moulé.* Ph. Rousseau. (36) June 10.
Wharf pour l'Embarquement Rapide des Charbons à Baltimore (États Unis). (33) July 22.
Chaudière de Locomotive à Tubes d'Eau: Système Robert.* F. Barbier. (33) July 29.
Nouvelles Locomotives Compound à Marchandises, à 4 Cylinders et à 2 Bogies Moteurs de la Compagnie du Chemin de Fer du Nord.* M. du Bosquet. (38) Aug.
Chauffage des Trains par la Vapeur sur le Réseau des Chemins de Fer de Paris à Lyon et à la Méditerranée. H. Mottet. (38) Aug.
Nouvelles Distributions pour Locomotives.* (33) Aug. 26.
Die Eisenbahnanlagen Bombays.* Blum and E. Giese. (49) Pt. 7-9, 1905.
Die Lüftungsanlagen beim Baue der Grossen Alpentunnels.* Karl Brabbée. (53) Serial beginning Aug. 11.

Railroad, Street.

The Development of Special Track Work on Street Railways. Victor Angerer. (From Paper read before the Connecticut Soc. of Civ. Engrs. and Surveyors.) (13) Aug. 3.
Leicester Tramways: Cost of Construction. (26) Aug. 4.
The Installation of Electric Tramways in Christchurch, New Zealand. James Drummond. (17) Aug. 5.
Electrolysis Investigations in Germany. (14) Aug. 5.
Some Methods Used in Car Barn Construction with a View to Fire Protection. (72) Aug. 15.
Exeter Corporation Tramways.* (72) Aug. 15.
Philadelphia's Rapid Transit Railroad.* (15) Serial beginning Aug. 18.
Convertible Electric Motor Cars: Brooklyn Heights Railroad.* (15) Aug. 25.
Power Plant of the Boston and Worcester Street Railway.* (20) Aug. 31.
The Engines of the Interborough Station.* (64) Sept.
English Street Railway Construction. Joseph Owen. (Abstract of a Paper read before the Incorporated Assoc. of Mun. and County Engrs.) (13) Sept. 7.
Chemin de Fer électrique de Saint-Gall à Speicher et à Trogen (Suisse).* H. Somach. (33) Aug. 26.

Sanitary.

The Reclamation of River Deltas and Salt Marshes.* J. Francis Le Baron, M. Am. Soc. C. E. (54) Vol. 54.
The Sewerage of Douglas, Isle of Man. Edmund Herbert Stevenson and Edward Kynaston Burstal, MM. Inst. C. E. (63) Vol. 160.

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Sanitary—(Continued).

Notes on the Working of the Shone System of Sewerage at Karachi.* James Forrest Brunton, M. Inst. C. E. (63) Vol. 160.
The Use of Concrete in Sewer Construction.* W. C. Parmley, M. Am. Soc. C. E. (1) June.
Sewage Purification with Special Reference to the Problem in Ohio. R. Winthrop Pratt. (1) June.
A Winter Visit to Some Sewage Disposal Plants in Ohio, Wisconsin and Illinois.* C. E. A. Winslow. (1) June.
The Heating and Ventilation of Schools.* (70) Serial beginning Aug.
Hot Blast Heating and Ventilation.* W. G. Bissell. (Paper read before the Amer. Soc. for the Advancement of Science.) (70) Aug.
Concerning Sewage Disposal from the Standpoint of Pollution of Oysters and Other Shellfish, and Especially with Reference to Their Transmission of Typhoid Fever. George W. Fuller. (3) Aug.; Abstract (14) Aug. 12.
Revised Plumbing Regulations for Massachusetts. (70) Aug.
Land Reclamation Along the Illinois River.* (14) Aug. 5.
The Significance of Analyses of Effluents from Sewage Works. (14) Aug. 5.
Rainfall and Runoff in Sewer Design. Charles Emerson Gregory, Assoc. M. Am. Soc. C. E. (60) Sept.
Sewage Disposal in Ohio, Wisconsin and Illinois. (14) Sept. 2.
L'Installation des Appareils de Chauffage et de Ventilation dans le Batiment Situe Rue Ducale à Bruxelles et Destiné aux Administrations Centrales des Postes et de la Marine.* M. Heyniux. (30) Aug.

Structural.

The Structural Design of Buildings.* C. C. Schneider, M. Am. Soc. C. E. (54) Vol. 54.
Revised General Specifications for Structural Work of Buildings. (54) Vol. 54.
The Influence of Carbon, Phosphorus, Manganese and Sulphur on the Tensile Strength of Open-Hearth Steel.* H. H. Campbell. (56) Vol. 35.
Factory Fire Protection and Water Supply.* (70) Aug.
Hollow Concrete Block Building Construction.* Spencer B. Newberry. (67) Aug.
A 300-ft. Chimney of Reinforced Concrete.* (13) Aug. 3.
Tests to Determine the Fire Resistance and Heat Conductivity of Concrete.* (Abstract of Special Com. Rept. presented before the Nat. Fire Protection Assoc.) (13) Aug. 3.
The Erection of the Wanamaker Store Building, Philadelphia.* (14) Aug. 5.
Reinforced Concrete Works in Belgium (dome of Antwerp Station).* (14) Aug. 5.
The Effect of Clay and Loam on the Strength of Portland Cement Mortars. W. C. Hoad. (Paper read before the Academy, at Topeka.) (13) Aug. 10.
A Large Hydraulic Testing Machine for Uniform Loads. R. A. Cummings. (Paper read before the Amer. Soc. for Testing Materials.) (13) Aug. 10; Abstract (14) Aug. 12.
Steelwork of the New General Electric Machine Shop.* (14) Serial beginning Aug. 12.
Steelwork of the Marion Power Station, Public Service Corporation of New Jersey.* (14) Aug. 19.
A Preliminary Report on the Effect of Combined Stresses on the Elastic Properties of Steel. Edward L. Hancock. (Paper read before the Amer. Soc. for Testing Materials.) (13) Aug. 24.
Tests of Reinforced Concrete Beams.* (18) Aug. 26.
Reinforced Concrete.* (19) Serial beginning Aug. 26.
A Unit Frame Reinforcement System of Concrete-Steel Construction.* (13) Aug. 31.
The Manufacture and Use of Concrete Blocks. F. W. Hagloch. (13) Aug. 31.
Investigation of the Effect of Heat upon the Crushing Strength and Elastic Properties of Concrete. Ira H. Woolson. (Paper read before the Amer. Soc. for Testing Materials.) (60) Sept.
Concrete Building Blocks. George E. Walsh. (Extracts from Paper in *Insurance Engineering.*) (60) Sept.
The Collapse of the Meyers Building, Albany.* (14) Sept. 2.
Steelwork of the Wanamaker Building, Philadelphia.* (14) Serial beginning Sept. 2.
Specific Gravity and Weight of Building Stone, Cements, and Other Non-Metallic Structural Materials. Edwin C. Eckel, Assoc. Am. Soc. C. E. (13) Sept. 7.
A System of Safeguards Against Freezing in Concrete Building Construction. (13) Sept. 7.
The Collapse of a Department Store Building at Albany, N. Y. (13) Sept. 7.
The Effect of Liquid-Air Temperatures on Iron and Its Alloys. R. A. Hadfield. (Abstract.) (62) Serial beginning Sept. 7.
Béton Armé.* M. Maynard. (Paper read before the Assoc. Internationale pour l'étude et l'Essai des Matériaux.) (36) June 10.

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Structural—(Continued).

La Flexion des Pièces Chargées Debout. Em. Rousseau. (30) Aug.
Considérations Économiques sur le Calcul des Ouvrages en Ciment Armé en Conformité avec les Règlements Administratifs.* N. de Tédesco. (35) Aug.
Die Titration des Kalkes in Rohmehl. H. Trachsler. (80) July 29.
Die Bruchursachen der Betoneisernen Geraden Träger. Max R. v. Thullie. (78) Serial beginning Aug.
Die Würfel- und Pfeilerfestigkeit.* A. Rössler. (78) Serial beginning Aug.
Die Tragfähigkeit der Balken aus Eisenbeton. F. v. Emperger. (Paper read before the Verein zur Erhaltung einer Mensa technica an der technischen Hochschule in Wien.) (78) Aug.
Neuere Dauerversuchsmaschinen.* Georg Wazau. (82) Serial beginning Aug. 5.
Betonbereitung mit Maschinen. (51) Serial beginning Aug. 9.
Eine Einfache Vorrichtung zur Veranschaulichung des Knickungsvorganges. A Sommerfeld. (48) Aug. 12.
Einige Bemerkungen zur Chemie des Portlandzements. Emil Schwarz. (80) Aug. 19.
Neuere Ausführungen von Eisenbetonbauten und den Eisenbetonbau in Beziehung zur Architektur.* Zöllner. (Paper read before the Deutscher Beton-Verein.) (80) Aug. 26.
Ergebnisse der Bruchprobebelastung mit Hennebique- und Möllerkonstruktionen auf der Deutschen Städteausstellung in Dresden.* C. Hanf. (Paper read before the Deutscher Beton-Verein.) (80) Aug. 26.

Water Supply.

The Water-Works of Porterville, California.* Philip E. Harroun, M. Am. Soc. C. E. (54) Vol. 54.
The Installation of a Pneumatic Pumping Plant.* Arthur H. Diamant, Jun. Am. Soc. C. E. (54) Vol. 54.
Steel and Concrete Construction at the Antwerp Water-Works. Easton Devonshire, Assoc. M. Inst. C. E. (Extracts from Paper read before the British Assoc. of Water-Works Engrs.) (66) July 25.
Locking Bar Joints for 32-in. Steel Water Main, Sydney, N. S. W. (13) Aug. 3.
Hydraulic Engines at the U. S. Naval Coaling Station, Bradford, R. I.* (13) Aug. 3.
Tastes and Odors in River Water Supplies. (13) Aug. 3.
Westinghouse Compound Pump.* F. H. Parke. (39) Sept.; (40) Aug. 4.
Hydro-Electric Power Station, California Gas & Electric Corporation, De Sabla, Cal.* J. D. Galloway. (13) Aug. 10.
Improvements of the Elgin Water Works. (14) Aug. 12.
The Intake of the Ontario Power Co.* (14) Aug. 12.
Electric Power Developments at Niagara Falls.* (46) Serial beginning Aug. 12.
The Brooks Centrifugal Pump.* (20) Aug. 17.
The Employment of Restraining Culture Media in Testing the Hygienic Efficiency of Sand Water Filters. A. Robin. (13) Aug. 17.
Pumping Engine, Rosario Water-Works.* (12) Aug. 18.
Pressure in City Water Works from Fire Protection View-Point. (14) Aug. 19.
Power Development by the Lewiston-Clarkston Co.* (14) Aug. 19.
Port Washington Water-Works under Air Pressure.* (14) Aug. 19.
Progress of Work on the New Water Supply System of Cincinnati, O.* (13) Aug. 24.
The Principles Governing the Valuation for Rate-Fixing Purposes of Water-Works under Private Ownership. Arthur L. Adams, M. Am. Soc. C. E. (Paper read before the Pacific Coast Eng. Cong.) (13) Aug. 24; (14) Aug. 5.
Mechanical Filters of the Brooklyn, N. Y., Water-Works.* (14) Aug. 26.
Hydro-Electric Developments of the Ontario Power Company.* (27) Aug. 26.
Hydraulic Generation and Application of Motive Power: Water Power Installation.* William M. Barr. (9) Sept.
Sterilization of Water.* Emile Guarini. (46) Sept. 2.
Ozone for Water Purification. (14) Sept. 2.
The Barossa Arched Concrete Dam.* (14) Sept. 2.
Earth Dams With Concrete Core Walls. Clemens Herschel, M. Am. Soc. C. E. (13) Sept. 7.
La Nouvelle Alimentation de Philadelphie en Eau de Rivière Filtrée.* Ch. Garnier. (36) Serial beginning May 25.
Aqueduc de Torresdale pour la Distribution d'Eau de Philadelphie.* (33) Aug. 12.
Alimentation de Coolgardie en Eau Potable par une Conduite de 565 Kilomètres.* Paul Raulin. (33) Aug. 26.
Die Wasserkräfte der Bayerischen Alpen.* L. Fischer-Reinau. (51) Serial beginning Aug. 5.
Maschinen aus Steinzeug mit Berechnung der Zentrifugalpumpen und Exhaustoren. Georg Lindner. (48) Aug. 12.

*Illustrated.

Waterways.

Technical Methods of River Improvement as Developed on the Lower Missouri River, by the General Government, from 1876 to 1903.* S. Waters Fox, M. Am. Soc. C. E. (54) Vol. 54.
The Reclamation of River Deltas and Salt Marshes.* J. Francis Le Baron, M. Am. Soc. C. E. (54) Vol. 54.
Maximum Rates of Rainfall at Boston.* Charles W. Sherman, M. Am. Soc. C. E. (54) Vol. 54.
The Compensating Works of the Lake Superior Power Company.* G. F. Stickney, Assoc. M. Am. Soc. C. E. (54) Vol. 54.
The River Hooghly.* Leveson Francis Vernon-Harcourt, M. Inst. C. E. (63) Vol. 100.
Improvements at the Entrance to the Richmond River, New South Wales. Thomas Edward Burrows, M. Inst. C. E. (63) Vol. 160.
The Gauging of Streams by Chemical Means.* Charles Edmond Stromeyer, M. Inst. C. E. (63) Vol. 160.
Ferro-Concrete Wharf at Dundee.* (12) July 28.
New Dock at Manchester.* (12) July 28.
The Great Blast at Henderson's Point, Portsmouth Navy Yard.* (13) Aug. 3.
The Irregular Flow of Rivers in Humid Prairie States. F. W. Hanna. (13) Aug. 3.
Stresses in Dams.* J. S. Wilson and W. Gore, Assoc. MM. Inst. C. E. (11) Aug. 4.
Canal Transport.* (22) Aug. 4.
Some Notes on Sea Protective Works on the North Coast of Jamaica. J. Monk Fletcher. (14) Aug. 5.
Destruction of Henderson's Point.* C. B. Morse. (14) Aug. 5.
Land Reclamation along the Illinois River.* (14) Aug. 5.
Percolation Tests of Concrete Blocks under High Heads of Water at the Borossa Dam, South Australia. (13) Aug. 10.
On the Stability of Masonry Dams. Karl Pearson. (71) Aug. 11.
Fishguard Harbour Works.* H. G. Archer. (11) Aug. 11.
The Electrical Equipment of Manaos Harbor, Amazon River.* Charles J. Seibert. (27) Aug. 19.
A Steel Wharf at Lome, Africa.* (14) Aug. 26.
Notes on the History of Lighthouses. Robert A. Cummings, M. Am. Soc. C. E. (13) Aug. 31.
The Gibb's Hill Lighthouse, Bermuda.* Robert A. Cummings, M. Am. Soc. C. E., and C. W. Reinhardt. (13) Aug. 31.
The Actual Problems of the Panama Canal. John F. Wallace. (9) Sept.
The Tampico Wharf.* (18) Sept. 2.
Dams for the New Plant of the United Shoe Machinery Co., Beverly, Mass.* (14) Sept. 2.
New Sea-Going Dredges.* Day Allen Willey. (19) Sept. 2.
Digue de la Société des Mines de Hodbarrow.* (33) July 29.
Les Barrages de la Loire.* M. Mazoyer. (30) Serial beginning Aug.
Construction du Phare de Beachy-Head (Angleterre).* (33) Aug. 26.
Vergleichung von Schleusen und Mechanischen Hebewerken, Prüsmann. (49) Pt. 7-9, 1905.

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* Illustrated.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

October 4th, 1905.—The meeting was called to order at 8.30 P. M.; President C. C. Schneider in the chair; Chas. Warren Hunt, Secretary; and present, also, 134 members and 21 guests.

The minutes of the meetings of September 6th and 20th, 1905, were approved as printed in the *Proceedings* for September, 1905.

A paper by Roberto Gayol, M. Am. Soc. C. E., entitled "Some Specialties of the System for Flushing the New Sewers of the City of Mexico," was presented by the Secretary, who also read a communication on the subject from Alexander Potter, Assoc. M. Am. Soc. C. E. A second paper, entitled "The Walworth Sewer, Cleveland, Ohio," by Walter C. Parmley, M. Am. Soc. C. E., was presented by the author. The Secretary read a communication on the subject from C. G. Force, M. Am. Soc. C. E., and the paper was dis-

cussed further by Messrs. Foster Crowell, C. E. Gregory, and the author.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

Andrews Allen, Chicago, Ill.
Chauncey Loomis Allen, Utica, N. Y.
Walter Root Armstrong, Chihuahua, Mexico.
Thomas Chalkley James Baily, Jr., Washington, D. C.
Harry Austin Belden, Manila, Philippine Islands.
Lincoln Bush, East Orange, N. J.
Charles Elbert Curtis, Johnstown, Pa.
William Sanborn Dawley, Chicago, Ill.
Howard Albert Dill, Richmond, Ind.
Edmund Hazen Drury, City of Mexico, Mexico.
Chester Harding, Washington, D. C.
John Bradford Harper, Blackrock, N. Mex.
Louis Clarence Hill, Roosevelt, Ariz.
Wilber Macaulay Judd, Pittsburg, Pa.
William States Lee, Jr., Charlotte, N. C.
Luis Matamoros, San José, Costa Rica.
Leopold Jehud Mensch, Chicago, Ill.
Frank Neher, St. Louis, Mo.
William Marshall Rees, Memphis, Tenn.
Louis E Ritter, Chicago, Ill.
William Gardner Russell, Russell, Kans.
Robert Erwin Sheal, Cleveland, Ohio.
Sakuro Tanabe, Kyoto, Japan.
Andrew Whitney Woodman, Boston, Mass.

As Associate Members.

Paul Beer, Des Moines, Iowa.
Henry Robinson Buck, Hartford, Conn.
Victor Hugo Cochrane, Pittsburg, Pa.
Frederick Davis, New York City.
Leander Dorsey, Clay Court House, W. Va.
Myron Samuel Falk, New York City.
Josiah Monk Fletcher, Albany, Jamaica, B. W. I.
Arthur Leonard Giles, Sioux City, Iowa.
Robert Parsons Howell, Phillipsburg, N. J.
Charles Adams Hunt, New York City.
Torao Kawaguchi, Kumamoto, Japan.
Marshall Ora Leighton, Washington, D. C.
Kieffer Lindsey, Syracuse, N. Y.

Gordon Stafford Meek, Conneaut, Ohio.
Clifford Older, Slater, Mo.
Clyde Potts, New York City.
Ralph Fenno Proctor, New York City.
John Charles Riedel, Brooklyn, N. Y.
Frank Harold Shaw, Lancaster, Pa.
Stanley Frederick Stokes, Standerton, South Africa.
Wilford Ashford Thompson, East St. Louis, Ill.
Clinton Draper Thurber, Norfolk, Va.
Hobart Brown Upjohn, New York City.
Frederick Creelman Waddell, New York City.
Edwin Carlton Woodward, Torrington, Wyo.

The Secretary announced the transfer of the following candidates, by the Board of Direction, on October 3d, 1905:

From Associate Member to Member.

Ernest Howard Baldwin, Alcova, Wyo.
George Lyon Christian, New York City.
Gustavus Adolphus Gessner, Jr., Toledo, Ohio.
Henry Cyprian Humphrey, Lucena, Tayabas Province, Philippine Islands.
Frank Pape McKibben, Boston, Mass.

The election of the following candidates, by the Board of Direction:

As Juniors.

On September 5th, 1905.
John Earl Cunningham, Chicago, Ill.
Charles Harold Splitstone, Allegheny, Pa.
Gordon Saxton Thompson, Troy, N. Y.

On October 3d, 1905.
William Burton, Cody, Wyo.
Clinton Hervey Crooks, Fairmont, W. Va.
Edward Crow, Lyttelton, New Zealand.
Robert Louis Reimann-Hansen, Cumberland, Md.
Joseph Shema, Baltimore, Md.
Paul Bertram Tallman, East Orange, N. J.
Eugene Adams Yates, New York City.

Adjourned.

October 18th, 1905.—The meeting was called to order at 8:30 P. M.; President Schneider in the chair; Chas. Warren Hunt, Secretary; and present, also, 90 members and 21 guests.

A paper, entitled "An Example of the Legitimate Use of Water for Domestic Purposes," by K. F. Cooper, Jun. Am. Soc. C. E., was presented by the Secretary, and discussed by Messrs. F. W. Dalrymple, G. W. Christian, M. R. Sherrerd, Alexander Potter, James Owen and V. H. Hewes.

The Secretary announced the following deaths:

NATHAN HOLLIS WHITTEN, elected Member June 7th, 1876; died August 23d, 1905.

VAN DUSEN HITE-SMITH, elected Associate Member April 3d, 1901; died August 27th, 1905.

SUTHERLAND MALLET PREVOST, elected Member January 6th, 1875; died September 30th, 1905.

GEORGE WILLIAM CATT, elected Member September 7th, 1892; died October 8th, 1905.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

October 3d, 1905.—President Schneider in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Bissell, Bowman, Davison, Ellis, Gowen, Knap, N. P. Lewis, Noble, Sherrerd and Webster.

Action was taken in regard to members in arrears for dues.

Richard L. Humphrey, M. Am. Soc. C. E., was appointed an additional member of the Special Committee to report on Concrete and Reinforced Concrete.

Past-Presidents O. Chanute and Robert Moore were appointed to represent the Society at the installation of the President of the University of Illinois, October 17th-19th, 1905.

The Secretary was directed to address a letter to all engineering societies, both in this country and abroad, stating that this Society would be glad to welcome any of their members to the use of this House and Library, and to any of its regular meetings.

Applications were considered, and other routine business transacted.

Five Associate Members were transferred to the grade of Member, and seven candidates for Junior were elected.

Adjourned.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, November 1st, 1905.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper entitled "The Theory of Frameworks with Rectangular Panels, and its Application to Buildings which have to Resist Wind," by Ernst F. Jonson, Assoc. M. Am. Soc. C. E., will be presented for discussion.

This paper was printed in *Proceedings* for September, 1905.

Wednesday, November 15th, 1905.—8.30 P. M.—At this meeting a paper entitled "The Ferry Bridge Across the Ship Canal at Duluth, Minnesota," by C. A. P. Turner, M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings.*

Wednesday, December 6th, 1905.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, entitled "A New Graving Dock at Nagasaki, Japan," by Naoji Shiraishi, M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings.*

PRIVILEGES OF LOCAL SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

The Boston Society of Civil Engineers will welcome any member of the American Society of Civil Engineers at its library and reading room, 715 Tremont Temple, Boston, which is open on week days from 9 A. M. to 5 P. M. Members will also be welcome at the meetings, which are held in the same building, on the evenings of the fourth Wednesday in January, and the third Wednesdays of other months, except July and August.

The rooms of **The St. Louis Engineers' Club** are in the business center of St. Louis, and visiting engineers are cordially invited to use them for mail, telephone service, information, etc.

The courtesies of **The Engineers' Society of Western Pennsylvania** have been extended to members of the American Society of Civil Engineers. The rooms of the Society, 410 Penn Ave., Pittsburg, Pa., are open at all times, and meetings are held as follows, except during July and August. REGULAR SECTION, Third Tuesdays; CHEMICAL SECTION, Thursdays following third Tuesdays; ME-

CHANICAL SECTION, First Tuesdays; STRUCTURAL SECTION, Fourth Tuesdays.

The Western Society of Engineers, Monadnock Block, Chicago, Ill., tenders to members of this Society the use of its rooms and facilities, together with the good offices of its Secretary and of a special Committee appointed for that purpose.

The Civil Engineers' Club of Cleveland, Ohio, invites members of this Society to make use of the Club rooms, at any time when in Cleveland. Cards will be furnished on application to the Secretary, Mr. J. C. Beardsley.

The Engineers' Club of Central Pennsylvania has established new quarters at the corner of Second and Walnut Streets, Harrisburg, Pa., and desires to extend the courtesies of the Club to visiting members of the American Society of Civil Engineers.

The Engineers' and Architects' Club of Louisville, Ky., cordially invites members of the American Society of Civil Engineers, visiting Louisville, to make use of its library and rooms, 303 Norton Building, Fourth and Jefferson Streets. The rooms are open week days during business hours.

The Engineers' Club of Philadelphia invites members of the American Society of Civil Engineers to make use of the Club rooms, 1122 Girard Street, at any time when in Philadelphia.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

LIST OF NOMINEES FOR THE OFFICES TO BE FILLED AT THE ANNUAL ELECTION, JANUARY 17th, 1906.

The following list of nominees for the offices to be filled at the Annual Meeting, January 17th, 1906, received from the Nominating Committee, was presented to the Board of Direction at its meeting on October 3d, 1905. The list has already been mailed to all Corporate Members.

For President, to serve one year:

FREDERIC P. STEARNS, Boston, Mass.

For Vice-Presidents, to serve two years:

ONWARD BATES, Chicago, Ill.
BERNARD R. GREEN, Washington, D. C.

For Treasurer, to serve one year:

JOSEPH M. KNAP, New York City.

For Directors, to serve three years:

J. WALDO SMITH, New York City, representing District No. 1.
GEORGE GIBBS, New York City, representing District No. 1.
EMIL SWENSSON, Pittsburg, Pa., representing District No. 4.
JAMES M. JOHNSON, Louisville, Ky., representing District No. 6.
WYNKOOP KIERSTED, Kansas City, Mo., representing District No. 6.
WILLIAM B. STOREY, JR., Topeka, Kans., representing District No. 7.

LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

Memphis, Tenn.

The Memphis Association of Members of the American Society of Civil Engineers was organized at a meeting held October 10th, 1905.

The Constitution and By-Laws suggested by the Board of Direction of the American Society of Civil Engineers were adopted.

The following officers were elected, to hold office until the third Wednesday of December, 1906:

President ..... ARTHUR HIDER,
First Vice-President ..... C. H. WEST,
Second Vice-President ..... JUSTIN BURNS,
Secretary ..... A. L. DABNEY,
Treasurer ..... F. H. HILLARD.

The Association will hold regular meetings, at 8 P. M., on the second Tuesday of each month, at its rooms, No. 43½ Madison Street, Memphis, Tenn., which is the time and place of the meeting of the Memphis Engineering Society.

ACCESSIONS TO THE LIBRARY.

From September 13th to October 10th, 1905.

DONATIONS.*

MECHANICS OF MATERIALS.

By Mansfield Merriman, M. Am. Soc. C. E. Tenth Edition, Rewritten and Enlarged. Cloth, 9 x 6 in., 11 + 507 pp., illus. New York, John Wiley & Sons, 1905. $5.

The preface states, that, in this new edition, it was found necessary to reset and rewrite the book, and the author has endeavored to keep the facts of experiment and practice constantly in view. The same general plan of treatment has been followed as before, but the subdivisions are somewhat different, and the fifteen chapters of the last edition have been increased to nineteen. A statement of average values of the principal materials of engineering is given. To exemplify the formulas and methods, many numerical examples are given in the text, these generally relating to cases that arise in practice, and one or more problems at the end of each article. It is stated that most of the topics of the last edition have been treated in a fuller manner. The subjects of impact on bars and beams, resilience and work, and apparent and true stresses have been much changed in order to make the presentation more clear and accurate. Among many new topics introduced are those of economic sections for beams; moving loads on beams; constrained beams with supports on different levels; the torsion of rectangular bars; compound columns and beams; reinforced-concrete beams; plates under concentrated loads; internal friction; rules for testing materials; and elastic electric analogies. There is an index of nine pages.

RESTRICTIVE RAILWAY LEGISLATION.

By Henry S. Haines, M. Am. Soc. C. E. Cloth, 8 x 5 in., 355 pp. New York, The Macmillan Company, 1905. $1.25 net. (Donated by the author.)

This work contains the substance of a course of twelve lectures delivered in April and May, 1905, at the Boston University School of Law, the aim of the author being to present the manner in which legislation and judicial decisions have affected the operations of railway corporations in their relations to the public. The contents are: Introduction; Railroad Corporations; Railroad Finance; Railroad Construction; Railroad Operation; Railroad Traffic; Rate-Making; Regulation of Rates; State Railroad Commissions; Pending Legislation Affecting Interstate Commerce; State Control of Corporations Engaged in Public Service; Conclusions. There is an index of nine pages.

THE STATICALLY-INDETERMINATE STRESSES IN FRAMES COMMONLY USED FOR BRIDGES.

By Isami Hiroi. Cloth, 8 x 5 in., 9 + 174 pp. New York, D. Van Nostrand Company, 1905. $2.

The preface states that the present work is the outgrowth of a series of lectures given to the students of Civil Engineering in the Tokyo Imperial University. It contains solutions of those problems most commonly met in the practice of a bridge engineer, the aim of the author being to save the time and labor of those intent on a more rational design for the class of structures treated, than is commonly followed, by furnishing the necessary formulas for which rough approximation, or even guess-work, frequently forms a substitute. The contents are: General Principles; Trussed Beams; Viaduct Bents; Continuous Girders; Arches with Two Hinges; Arches without Hinges; Suspension Bridges; Trusses with Redundant Members; Secondary Stresses due to Rigidity of Joints.

HANDBOOK OF COST DATA FOR CONTRACTORS AND ENGINEERS;

A Reference Book Giving Methods of Construction and Actual Costs of Materials and Labor on Numerous Engineering Works.

*Unless otherwise specified, books in this list have been donated by the publishers.

By Halbert P. Gillette, M. Am. Soc. C. E. Leather, 6 x 4 in., 12 + 610 pp. New York, Myron C. Clark, 1905. $4. (Donated by the author.)

The preface states that this book differs from "price books" written for house builders—books on prices of materials and contract prices—aside from the fact that it covers the whole field of civil engineering, in that it is a book in which *costs* are analyzed and discussed. The author aims to distinguish between the term *cost* and the term *price*. Although itemized cost data occupy many scores of pages in this book, there are many more scores of pages devoted to descriptions of how the work was done, the organization of the forces, and the machines used, the figures, in all cases, being from actual records. An attempt is made in the first part of the book to outline some of the best systems of cost keeping. The Contents are: Cost Keeping, Preparing Estimates, Organization of Forces, etc.; Cost of Earth Excavation; Cost of Rock Excavation, Quarrying and Crushing; Cost of Roads, Pavements, Walks, etc.; Cost of Stone Masonry; Cost of Concrete Construction of all Kinds; Cost of Water Works; Cost of Sewers, Vitrified Conduits and Tile Drains; Cost of Piling, Trestling and Timber Work; Cost of Erecting Buildings; Cost of Steam and Electric Railways; Cost of Bridge Erection and Painting; Cost of Railway and Topographic Surveys; Cost of Miscellaneous Structures. An index is contained in six pages.

PROCEEDINGS OF THE INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

Vol. XXX, 1903-04. Edited by Thomas Cole. Cloth, 9 x 6 in., illus., 60 + 674 pp. New York, Spon & Chamberlain, 1905.

This volume contains the following papers, with discussion: Municipal Works of Widnes, by J. S. Sinclair; Gas and Water Undertakings of Widnes, by I. Carr; Transporter Bridge over the Mersey at Widnes, by J. J. Webster; Municipal Works of Runcorn, by J. Wilding; Twenty Years of Municipal Engineering Work in Aberdeen, by W. Dyack; Notes on Aberdeen Waterworks, by J. Gordon; the Aberdeen Electric Cable Subway and High-Level Sewer, by G. R. G. Conway; Tramway Construction in Aberdeen, by J. T. Anderson; The Water Supply of Hastings, by P. H. Palmer; East Hill Water-Balance Passenger Lift, by P. H. Palmer; The New By-Laws Made by London County Council in Regard to Depositing Drainage Plans, by W. Weaver; Municipal Works of Great Grimsby, by H. G. Whyatt; Great Grimsby Electricity Works, by W. A. Vignolles; Ventilation of Sewers, by H. G. Whyatt; Notes on Newcastle-on-Tyne, by F. J. Edge; Newcastle Tramways System, by A. E. LeRossignol; Sewerage and Sewage Disposal of York, by A. Creer; Municipal Works at Buxton, by W. H. Grieves; Newport and its Municipal Works, by R. H. Haynes; Newport Electricity and Tramways Department, by H. C. Bishop; Newport Borough Asylum, by A. J. Wood; American Sewer Design and Construction, by J. S. Hodgson; Sewage Problem Solved, by W. D. Scott-Moncrieff; Shrewsbury Main Drainage, by G. M. Taylor; Shone System of Sewer Ventilation, by E. G. Mawbey; Notes on Reservoir Construction, by Geo. Mitchell; Isolation Hospitals, by F. Smythe; Clee Hill Basalt, by Wm. Clark; Description of Automatic Electrically-Driven Pumping Machinery, by Messrs. Taylor, Sons and Santo Crimp. There is a general classified index of volumes 1 to 30, with a reference guide to index, all contained in one hundred and forty-five pages.

Gifts have also been received from the following:

Am. Academy of Arts and Sci. 1 pam.
Am. Inst. of Archts. 1 vol.
Atchison, Topeka & Santa Fe Ry. Co. 1 pam.
Bangor & Aroostook R. R. Co. 1 pam.
Berg, W. G. 6 bound vol., 20 vol., 18 pam.
Boston, Mass.—Parks, Dept. of. 1 pam.
Boston & Maine R. R. Co. 1 pam.
Boston Public Library. 1 pam.
Canada Atlantic Ry. Co. 2 pam.
Castanheira das Neves, J. da P. 1 pam.
Chicago & Alton Ry. Co. 1 pam.
Chicago & North Western Ry. Co. 1 pam.
Chicago, Indianapolis & Louisville Ry. Co. 2 pam.
Chicago, Peoria & St. Louis Ry. Co. 3 pam.
Chicago, St. Paul, Minneapolis & Omaha Ry. Co. 2 pam.
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Municipal Art Soc. of New York. 1 bound vol., 2 pam.
Municipal Engrs. of the City of New York. 1 bound vol.
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New South Wales—Govt. Statistician. 1 pam.
New York City—Bureau of Buildings. 1 bound vol.
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Pontzen, Ernest. 1 pam.
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U. S. Bureau of Labor. 1 vol.
U. S. Bureau of Statistics. 1 pam.
U. S. Interstate Commerce Comm. 9 pam.
U. S. Lake Surv. Office. 1 map.
U. S. Office of Exper. Stations. 1 bound vol.
U. S. War Dept. 35 specif., 1 pam.
U. S. Weather Bureau. 1 bound vol.
Univ. of Illinois—Agri. Exper. Station. 1 bound vol.
Univ. of Kansas Library. 2 bound vol., 5 pam.
Van Sandick, R. A. 1 pam.
Western Australia—Dept. of Mines. 1 vol.

BY PURCHASE.

Modern Refrigerating Machinery, its Construction, Methods of Working and Industrial Applications; A Guide for Engineers and Owners of Refrigerating Plants. By Hans Lorenz. Authorized Translation from the Third German Edition; by Thomas H. Pope, with Chapters on American Practice in Refrigeration, Insulation and other Cooling; by H. M. Haven and F. W. Dean. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1905.

A History of the Theory of Elasticity and of the Strength of Materials from Galilei to the Present Time. By Isaac Todhunter; Edited and Completed by Karl Pearson. 3 vols. Cambridge, The University Press, 1886-1893.

Forscherarbeiten auf dem Gebiete des Eisenbetons, Heft III. Die Rolle der Haftfestigkeit im Verbundbalken. von Dr. Fritz v. Emperger. Berlin, Wilhelm Ernst & Sohn, 1905.

Repertorium der Technischen Journal-Literatur. Herausgegeben im Kaiserlichen Patentamt, Jahrgang 1904. Berlin, Carl Heymanns, 1905.

The Corporation of the City of Glasgow; Handbook on the Municipal Enterprises. Glasgow, Robert Anderson, 1904.

Commercial Economy in Steam and other Thermal Power-Plants as Dependent upon Physical Efficiency, Capital Charges and Working Costs. By Robert H. Smith; with Numerous Diagrams by H. Malcolm Hodson. London, A. Constable & Co., Limited; Philadelphia, J. B. Lippincott Company, 1905.

SUMMARY OF ACCESSIONS.

September 13th to October 10th, 1905.

Donations (including 32 duplicates)	219
By purchase	8
Total	227

MEMBERSHIP.

ADDITIONS.

MEMBERS.

		Date of Membership.
Comstock, Charles Worthington. Civ. and Min. Engr., 213 Boston Bldg., Denver, Colo	Jun.	April 5, 1892
	Assoc. M.	Feb. 7, 1900
	M.	Sept. 5, 1905
Cooper, Hugh Lincoln. Cons. Engr., 60 Wall St., New York City,		Sept. 6, 1905
Davis, Frank Leslie. City Engr., 818 North I St., Tacoma, Wash.		Sept. 6, 1905
Gordon, Charles Edward. U. S. Reclamation Service, Lawton, Okla.		Sept. 6, 1905
Gumaer, Edward Bennet. Contr. Engr., 27 Glenwood Ave., Jersey City, N. J.		Sept. 6, 1905
Hughes, David Edward. U. S. Asst. Engr., San Pedro, Cal.		Sept. 6, 1905
O'Brien, Joseph Henry. Engr., Westinghouse, Church, Kerr & Co., 10 Bridge St., New York City.	Assoc. M.	May 1, 1901
	M.	Sept. 5, 1905
Robbins, Samuel Bostwick. Engr., Reclamation Service, U. S. Geological Survey, Great Falls, Mont.		Sept. 6, 1905
Russell, Samuel Moorhead. Supt., Tol., Peoria & West. Ry., Union Station, Peoria, Ill.		Sept. 6, 1905
Snyder, Francis Edward. Asst. Engr., A., T. & S. F. Ry. System, Railway Exchange Bldg., Chicago, Ill.		Sept. 6, 1905
Thornley, Julian. Senior Asst. Engr., Elec. Development Co. of Ontario, Ltd., Niagara Falls, Ont., Canada.	Assoc. M.	Jan. 2, 1901
	M.	Sept. 5, 1905
Tripp, Oscar Holmes. Room 30, Court House, Rockland, Me.	Assoc. M.	Oct. 7, 1896
	M.	Sept. 5, 1905
Webb, DeWitt Clinton. Civ. Engr., U. S. N., 5051 Walton Ave., West Philadelphia, Pa.		Sept. 6, 1905
Wood, Alvinus Brier. Mgr., Ore. & Southeast. R. R. Co., Cottage Grove, Ore.		Sept. 6, 1905

ASSOCIATE MEMBERS.

Ackerman, John Walter. City Engr., Auburn, N. Y.		Sept. 6, 1905
Alderman, Clarence Edson. 18 Chadwick St., Worcester, Mass.		Sept. 6, 1905
Bieler, Alphonsos Henry. 64 Tenafly Rd., Englewood, N. J.		June 7, 1905
Boucher, William James. Room 2032, Park Row Bldg., New York City.		Sept. 6, 1905

		Date of Membership.
BROWN, WILLIAM LOWE. Res. Engr., North River Div., Penn., N. Y. & L. I. R. R. Tunnels, 1 West 34th St., New York City		Sept. 6, 1905
CLAUSEN, JACOB CENTENNIAL. Engr., U. S. Reclamation Service, Yuma, Ariz.		Sept. 6, 1905
GOODRIDGE, JOHN WESLEY. Asst. Engr., Rapid Transit R. R. Commrs. (5th Div.), New York City (Res., 292 Marlborough Rd., Brooklyn, N. Y.)	Jun. Assoc. M.	Oct. 4, 1898 April 5, 1905
GRADY, CHARLES BENEDICT. 417 Gregory Ave., West Orange, N. J.		Sept. 6, 1905
HENDERSON, SAMUEL WHILDEN. Chf. Engr. and Gen. Mgr., The Animas Co., Durango, Colo.		Sept. 6, 1905
HOWARD, ERNEST EMMANUEL. Asst. Engr., Waddell & Hedrick, 608 New Nelson Bldg., Kansas City, Mo.	Jun. Assoc. M.	Dec. 3, 1901 Sept. 6, 1905
MCCOY, SAMUEL ALEXANDER. Div. Engr., C., R. I. & P. R. R., Fordyce, Ark.		Sept. 6, 1905
MEES, CURTIS ADOLPH. Southern Power Co., Charlotte, N. C.		Sept. 6, 1905
NORRIS, WALTER HENRY. Chf. Engr.'s Office, B. & M. R. R., North Station, Boston, Mass.		Sept. 6, 1905
OWEN, ARTHUR EDMUND. Asst. to Chf. Engr., C. R. R. of N. J., Grove St., Montclair, N. J.		May 3, 1905
POTTS, CLYDE. Civ. and San. Engr., 1702 Whitehall Bldg., New York City	Jun. Assoc. M.	Dec. 3, 1901 Oct. 4, 1905
SAWYER, WILBUR CYRUS. Asst. Engr., U. S. Geological Survey, Reclamation Service, Pendleton, Ore.	Jun. Assoc. M.	Oct. 6, 1903 Sept. 6, 1905
SMITH, GEORGE EDSON PHILIP. Prof. of Eng., Univ. of Arizona, Tucson, Ariz.	Jun. Assoc. M.	Feb. 3, 1903 Sept. 6, 1905
STEWART, JOHN TRUESDALE. Paxton, Ill.		Sept. 6, 1905

ASSOCIATES.

MAY, THEODORE MARTIN. Care, Fireproof Bldg. Co., 103 West 42d St., New York City		Dec. 7, 1904
WRENN, JAMES FRANCIS. Gen. Supt., Sands & Oliver, Contrs., Suffolk, Va.		Sept. 6, 1905

JUNIORS.

CUNNINGHAM, JOHN EARL. C., M. & St. P. R. R., Railway Exchange Bldg., Chicago, Ill.		Sept. 5, 1905
DECKER, ARTHUR JAMES. 85 West 10th Ave., Columbus, Ohio		Sept. 5, 1905
LANAGAN, FRANK RAY. 273 Hamilton St., Albany, N. Y.		Sept. 5, 1905

	Date of Membership.
SHAW, DAVID JOSEPH. 362 West 123d St., New York City.	April 4, 1905
SHELEY, HORACE WEST. Care, U. S. Geological Survey, P. O. Box S, Salt Lake City, Utah	Sept. 5, 1905
SPLITSTONE, CHARLES HAROLD. 1024 Kirkpatrick Ave., Allegheny, Pa	Sept. 5, 1905
TALLMAN, PAUL BERTRAM. 46 Chestnut St., East Orange, N. J	Oct. 3, 1905
TEIGEN, THOMAS WILLIAM ROSTAD. Res. Engr., Little Rock & South. Ry., Traskwood, Ark	Sept. 5, 1905
THOMPSON, GORDON SAXTON. 861 Second Ave., Upper Troy, N. Y	Sept. 5, 1905

REINSTATEMENT.

NOYES, HARRY LINCOLN. 157 Michigan Ave., Chicago, Ill. Resignation previously accepted by Board of Direction, reconsidered and reinstatement ordered September 5th, 1905.

CHANGES OF ADDRESS.

MEMBERS.

BURDETT, FREDERICK ANDERSON. Cons. Engr., 29 West 34th St., New York City.

CATTELL, WILLIAM ASHBURNER. Care, E. H. Rollins & Sons, 433 California St., San Francisco, Cal.

DAVISON, GEORGE STEWART. Cons. Engr., 814 Frick Bldg., Pittsburg, Pa.

DENNIS, WILLIAM FRANKLIN. Vice-Pres., Rinehart & Dennis Co., Gen. Ry. Contrs., Colorado Bldg., Washington, D. C.

DEYO, SOLOMON LEFEVRE. Chf. Engr., Interstate Tunnel Ry. Co., 34 Nassau St., New York City.

DILLMAN, GEORGE LINCOLN. (Dillman & Hunt), Union Trust Bldg., San Francisco, Cal.

FERNSTROM, HENNING. Care, The Tidewater Ry. Co., Norfolk, Va.

FITCH, ASA BETTS. Hollywood, Cal.

FULTON, JOHN ADDISON. 1597 Woodward Ave., Detroit, Mich.

GOING, ALVAH SEYMOUR. Care, H. G. Kelley, Guaranty Bldg., Minneapolis, Minn.

HARLOW, JAMES HAYWARD. Conowingo, Md.

HILL, GEORGE. Cons. Engr., 33 Union Sq., West, New York City.

HOOD, RICHARD HADEN. 299 Broadway, Room 1606, New York City.

JUDSON, WILLIAM VOORHEES. Capt., Corps of Engrs., U. S. A., U. S. Engr. Office, Milwaukee, Wis.

KASTL, ALEXANDER EDWARD. Care, Met. Water Works, Clinton, Mass.

KELLER, CHARLES. Capt., Corps of Engrs., U. S. A., U. S. Engr. Office, Old Custom House, Detroit, Mich.

KENNEDY, JAMES HENRY. Chf. Engr., Vancouver, Victoria & East. Ry. & Nav. Co., Midway, B. C., Canada.

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DEATHS.

Catt, George William. Elected Member, September 7th, 1892; died October 8th, 1905.

Hite-Smith, Van Dusen. Elected Associate Member, April 3d, 1901; died August 27th, 1905.

Prevost, Sutherland Mallet. Elected Member, January 6th, 1875; died September 30th, 1905.

Whitten, Nathan Hollis. Elected Member, June 7th, 1876; died August 23d, 1905.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(September 10th to October 7th, 1905.)

NOTE.—*This list is published for the purpose of placing before the members of the Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal,* Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings,* Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal,* Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal,* Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions,* Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly,* Columbia Univ., New York City, 50c.
(7) *Technology Quarterly,* Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator,* Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine,* New York City, 25c.
(10) *Cassier's Magazine,* New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News,* New York City, 15c.
(14) *The Engineering Record,* New York City, 12c.
(15) *Railroad Gazette,* New York City, 10c.
(16) *Engineering and Mining Journal,* New York City, 15c.
(17) *Street Railway Journal,* New York City. Issues for first Saturday of each month 20c., other issues 10c.
(18) *Railway and Engineering Review,* Chicago, Ill., 10c.
(19) *Scientific American Supplement,* New York City, 10c.
(20) *Iron Age,* New York City, 10c.
(21) *Railway Engineer,* London, England, 25c.
(22) *Iron and Coal Trades Review,* London, England, 25c.
(23) *Bulletin,* American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal,* New York City, 10c.
(25) *American Engineer,* New York City, 20c.
(26) *Electrical Review,* London, England.
(27) *Electrical World and Engineer,* New York City, 10c.
(28) *Journal,* New England Water-Works Assoc., Boston, $1.
(29) *Journal,* Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique,* Brussels, Belgium.
(31) *Annales de l'Assoc. des Ing. Sortis des Ecoles Speciales de Gand,* Brussels, Belgium.
(32) *Memoires et Compte Rendu des Travaux,* Soc. Ing. Civ. de France, Paris, France.
(33) *Le Genie Civil,* Paris, France.
(34) *Portefouille Economique des Machines,* Paris, France.
(35) *Nouvellcs Annales de la Construction,* Paris, France.
(36) *La Revue Technique,* Paris, France.
(37) *Review de Mecanique,* Paris, France.
(38) *Revue Generale des Chemins de Fer et des Tramways,* Paris, France.
(39) *Railway Master Mechanic,* Chicago, Ill., 10c.
(40) *Railway Age,* Chicago, Ill., 10c.
(41) *Modern Machinery,* Chicago, Ill., 10c.
(42) *Proceedings,* Am. Inst. Elect. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussees,* Paris, France.
(44) *Journal,* Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals,* Scranton, Pa., 20c.
(46) *Scientific American,* New York City, 8c.
(47) *Mechanical Engineer,* Manchester, England.
(48) *Zeitschrift,* Verein Deutscher Ingenieure, Berlin, Germany.
(49) *Zeitschrift für Bauwesen,* Berlin, Germany.
(50) *Stahl und Eisen,* Düsseldorf, Germany.
(51) *Deutsche Bauzeitung,* Berlin, Germany.
(52) *Rigasche Industrie-Zeitung,* Riga, Russia.
(53) *Zeitschrift,* Oesterreichischer Ingenieur und Architekten Verein, Vienna, Austria.

(54) *Transactions,* Am. Soc. C. E., New York City, $5.
(55) *Transactions,* Am. Soc. M. E., New York City, $10.
(56) *Transactions,* Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian,* London, England.
(58) *Proceedings,* Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions,* Mining Inst. of Scotland, London and Newcastle-upon-Tyne, England.
(60) *Municipal Engineering,* Indianapolis, Ind., 25c.
(61) *Proceedings,* Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World,* 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings,* Inst. C. E., London, England.
(64) *Power,* New York City, 20c.
(65) *Official Proceedings,* New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting,* London, England, 15c.
(67) *Cement and Engineering News,* Chicago, Ill., 25c.
(68) *Mining Journal,* London, England.
(70) *Engineering Review,* New York City, 10c.
(71) *Journal,* Iron and Steel Inst., London, England.
(72) *Street Railway Review,* Chicago, 30c.
(73) *Electrician,* London, England, 18c.
(74) *Transactions,* Inst. of Min. and Metal., London, England.
(75) *Proceedings,* Inst. of Mech. Engrs., London, England.
(76) *Brick,* Chicago, 10c.
(77) *Journal,* Inst. Elec. Engrs., London, England.
(78) *Beton und Eisen,* Vienna, Austria.
(79) *Forscherarbeiten,* Vienna, Austria.
(80) *Tonindustrie-Zeitung,* Berlin, Germany.
(81) *Zeitschrift für Architektur und Ingenieurwesen,* Wiesbaden, Germany.
(82) *Dinglers Polytechnisches Journal,* Berlin, Germany.
(83) *Progressive Age,* New York City, 15c.

LIST OF ARTICLES.

Bridge.

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Concrete Viaduct at Riverside, California.* H. Hawgood, M. Inst. C. E. (14) Sept. 9.
Specifications for Structural Steel for Bridges.* (Rept. on proposed standard specifications presented at the Amer. Soc. for Testing Materials.) (18) Sept. 9.
Concrete Plant for the Brooklyn Anchorage of the Manhattan Bridge.* (14) Sept. 9.
A Reinforced-Concrete Double-Track Railroad Arch Bridge.* (14) Sept 9.
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The St. Lawrence River Bridge at Quebec, Canada.* (15) Sept. 15.
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A Long Single-Track Plate-Girder Span.* (14) Sept. 16.
The Erection of the Thebes Bridge Superstructure.* (14) Sept. 16.
The Plauen Viaduct.* (19) Sept. 16.
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Eine Eisenbeton-Brücke als Bogen mit Zugband.* H. Schürch. (51) Sept. 6.
Dreigelenk-Bogenbrücke aus Stampfbeton über den Teltowkanal bei Britz.* Wiig. (51) Sept. 9.

Electrical.

The Lachine Rapids Power House of the Lachine Rapids Hydraulic & Land Company, Limited, Montreal.* R. S. Kelsch. (5) Vol. 17, Pt. 2.
The Eddy Current Brake for Testing Motors.* D. K. Morris and G. A. Lister. (77) Sept.
Alternating-Current Motors in Industrial Service. P. D. Ionides. (77) Sept.
E. M. F. Wave Forms.* E. A. Biedermann and J. B. Sparks. (77) Sept.
Electric Heating—Its History and Development. A. E. Jepson. (77) Sept.
Standardization of Enclosed Fuses. H. O. Lacount. (42) Sept.
Air-Gap Flux in Induction Motors.* A. S. Langsdorf. (42) Sept.

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Electrical—(Continued).

Electric Automotor Omnibuses.* H. E. P. Cottrell. (12) Serial beginning Sept. 1.
The Spacing of the Wires on High-Pressure Power Lines. W. B. Esson. (26) Sept. 1.
The Yorkshire Electric Power Co.'s System of Generation and Distribution.* (73) Serial beginning Sept. 1; (26) Sept. 1.
Wireless Telegraphy. William Henry Preece. (Paper read before the British Assoc. for the Advancement of Science.) (73) Sept. 1.
The Testing of High-Tension Insulating Materials.* C. Kinzbrunner. (73) Serial beginning Sept. 8.
Alternate-Current Electrolysis. Ernest Wilson. (Abstract of paper read before the Faraday Soc.) (73) Sept. 8.
A Norwegian Hydro-Electric Power Plant.* Alfred Gradenwitz. (26) Sept. 8.
The Mabbs Electric Elevator.* (27) Sept. 9.
New Turbo-Generator Plants of the Clyde Valley Electrical Power Co., Ltd.* (14) Sept. 9.
The New Waterside Station of the New York Edison Co.* (14) Sept. 9.
Adams-Randall High-Power Telephone Transmitter Tests. William Maver, Jr. (27) Sept. 9.
Telephony.* Herbert Laws Webb. (29) Serial beginning Sept. 15.
Notes on the Localisation of Cable Faults.* Henry Joseph. (26) Sept. 15.
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Practical Standards for Electrical Measurements. (Rept. to British Assoc. for the Advancement of Science by the Com. on Elec. Standards.) (73) Sept. 15.
The Walthamstow Electric Lighting and Tramways Undertakings.* (26) Sept. 15.
Regulation of Transmission Lines.* (26) Sept. 15.
Up-to-date Electrical Power Distribution. R. Loraine Gamlin. (Paper read before the Inst. of Min. Engrs.) (68) Sept. 16.
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New Wireless Telegraph Station at South Boston. (27) Sept. 16.
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The Siemens & Halske Printing Telegraphic Apparatus.* (26) Sept. 22.
Spark Gaps. James Foster King. (27) Sept. 23.
The 5,000 H. P. Gas Engines of the California Gas & Electric Corporation. J. Martin. (Paper read before the Pacific Coast Gas Assoc.) (14) Sept. 30.
Electric Light, Water Works and Central Hot-Water Heating Installation at Ada, O.* A. E. Buchenberg. (27) Sept. 30.
Thermodynamics of the Electric Incandescent Lamp. E. F. Roeber. (From paper read before the Amer. Electrochemical Soc.) (27) Sept. 30.
Electrical Equipment of the B. F. Sturtevant Company Works.* Howard F. Knowlton. (27) Sept. 30.
The Municipal Central Power Station of Hanover, Germany.* (64) Oct.
Les Appareils de Levage a l'Exposition de Liége.* L. Ramakers. (33) Sept. 23.

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Submarine Signalling.* (12) Sept. 1.
The Dynamics of Screw Propellers.* (12) Sept. 1.
Steam Turbines as Applied to Ocean Liners. J. Harvard Biles. (Paper read before the British Assoc. for the Advancement of Science.) (73) Sept. 15; (12) Sept. 22.
The Action of Capped Armor-Piercing Shell.* Eugen Kodar v. Thurnwerth. (Tr. from the *Mitteilungen aus dem Gebiete des Seewesens.*) (13) Oct. 5.
La Corrosion du Cuivre par l'Eau de Mer Moyens de la Prévenir. (33) Sept. 23.
Vibrationserscheinungen der Dampfer. Otto Schlick. (48) Serial beginning Sept. 16.

Mechanical.

Some Notes on the Steam Turbine.* Homer M. Jaquays. (5) Vol. 17, Pt. 2.
Electrically Welded Screw Caps and Bolts. (Rept. of Com. on Science and the Arts on the Method of the Cleveland Cap Screw Co.) (3) Sept.
Mould Drying.* (22) Sept. 1.
Suggestions for Steam Economy. William McKay. (Paper read before the Canadian Elec. Assoc.) (47) Sept. 2.
The New Winnall Gas-Works for Winchester.* (66) Sept. 5.
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Testing Cast Iron.* E. L. Rhead. (47) Serial beginning Sept. 9.
Pig Iron for Foundry Works. P. Munnoch. (Paper read before the Cleveland Inst. of Engrs.) (47) Sept. 9.

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Compression and Transmission of Illuminating Gas. E. A. Rix. (Paper read before the Pacific Coast Gas Assoc.) (83) Sept. 15.
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The Strength of Laminated Springs. H. E. Wimperis. (12) Sept. 15.
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The Dessau Vertical Retort.* J. Bueb. (Translation of Paper read before the German Continental Gas Co.) (66) Sept. 26.
The New Plant of the B. F. Sturtevant Company, Hyde Park, Mass.* (20) Sept. 28; (40) Sept. 29.
Fly Wheel Explosions.* Wm. H. Boehm. (Abstract of Article in *Insurance Eng.*) (20) Sept. 28.
The New Shops of the B. F. Sturtevant Company.* Howard S. Knowlton. (14) Sept. 30.
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The Steam Turbine. F. R. Low. (64) Oct.
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Du Système Rateau pour l'Utilisation des Vapeurs d'Echappement. H. Denis. (36) Serial beginning June 25.
Les Applications de la Vapeur Surchauffée aux Machines. Ch. Compère. (32) Aug.
La Surchauffe Appliquée à la Machine à Vapeur d'Eau.* François Sinigaglia. (37) Aug.
Machine a Vapeur pour Laminoir de 16,000 Chevaux.* (33) Aug. 5.
Moteur Diesel de 500 Chevaux, a Trois Cylinders Installé à l'Exposition de Liége.* (33) Sept. 9.
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Glesserei-Maschinen und- Einrichtungen.* (50) Serial beginning Sept. 1.
Bemerkenswerte Kraftmaschinen auf der Weltausstellung zu Lüttich 1905.* H. Dubbel. (48) Sept. 2.
Physikalisch-chemische Betrachtungen über den Verbrennungsprozess in den Gasmotoren.* W. Nernst. (48) Sept. 2.
Neuere Universalwalzwerke.* Fr. Frölich. (48) Sept. 2.
Versuche mit überhitztem Dampf—Bericht über die bisherigen Arbeiten in der dampftechnischen Versuchsanstalt des bayerischen Revisions-Vereins in München. Berner. (48) Sept. 2.
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Die Internationale Automobilausstellung in Berlin vom 4. bis 19. Februar, 1905.* (53) Serial beginning Sept. 15.
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Open Hearth Furnace Comparisons. A. D. Williams, Jr. (20) Sept. 21.
The Huntington-Heberlein Process at Friedrichshütte. A. Biernbaum. (Tr. from the *Zeitschrift für das Berg-Hutten- und Salinenwesen, im Preuss. Staate.*) (16) Sept. 23.
The Bormettes-Method of Lead and Copper Smelting.* Alfredo Lotti. (16) Sept. 30.
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Large Gate Valve for Low Pressures. John J. Smith. (Abstract of Paper in *Amer. Machinist.*) (16) Sept. 30.
La Métallurgie du Cuivre aux États-Unis. (32) July.

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A High-Speed Electrically-Driven Compressor for Colliery Work.* W. Reavell. (Abstract of Paper read before the South Wales Inst. of Engrs.) (73) Sept. 1.
Accidental Breakage of Winding Ropes in Mines. John Perry. (Paper read before the British Assoc. for the Advancement of Science.) (12) Sept. 1; (57) Sept. 22.
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Blasting Coal in Bituminous Mines.* J. T. Beard. (16) Serial beginning Sept. 23.
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The Organization and Conduct of the Brooklyn Bureau of Street Repairs. Edwin J. Fort, M. Am. Soc. C. E. (Paper read before the Amer. Soc. of Mun. Improvements.) (13) Sept. 28.
Factors in Asphalt Paving Construction, Maintenance and Cost. Andrew Rosewater. (Paper read before the League of Amer. Municipalities.) (14) Sept. 30.
Effect of Water upon Asphalts. A. W. Dow. (60) Oct.
Emploi des Pavés d'Asphalte Comprimé pour la Construction des Chaussées.* E. Masselon. (36) July 25.

Railroad.

Interurban Electric Traction Systems, A. C. *versus* D. C. P. M. Lincoln. (5) Vol. 17, Pt. 2.
Some Possibilities of the Alternating Current Single Phase Railway Motor. A. H. Armstrong. (5) Vol. 17, Pt. 2.
Notes on Polyphase Equipments of Some European High Speed Electric Railways.* L. A. Herdt. (5) Vol. 17, Pt. 2.
Grade-Crossing Problems in St. Louis. Carl Gayler. (1) July.
Forces Due to Eccentric Weights Attached to Rolling Wheels. Calvin M. Woodward. (1) July.
The Siemens-Halske Power Signalling Plant at Antwerp Central Station: Belgian State Railways.* (21) Sept.
Superheated Steam in Locomotive Service.* W. F. M. Goss. (3) Sept.
The Brotan Locomotive Boiler.* H. W. Hanbury, Assoc. M. Inst. C. E. (11) Sept. 1.
Flexible Firebox Staybolts for Locomotives.* (47) Sept. 2.
Six-Wheel Coupled Bogie Tank Locomotive (2-ft. 5½-in. Gauge) for Egypt.* (11) Sept. 8.
Snowshed Signals on the Southern Pacific.* H. C. Barnes. (Discussion of Paper by E. M. Cutting.) (40) Sept. 8.
Four Cylinder Balanced Compound Locomotive—Great Northern Railway of England. F. C. Coleman. (40) Sept. 8.

*Illustrated.

Railroad—(Continued).

Four-Cylinder Compound Locomotive—New York Central Railroad. (12) Sept. 8.
Hydrostatic Tests of Locomotive Boiler. (18) Sept. 9.
The Berlin-Zossen High-Speed Tests of 1901. (17) Sept. 9.
Some Practical Points in the Double Tracking of Railways. (13) Sept. 14.
The Pennsylvania R.R. Tunnel under Capitol Hill, Washington, D. C.* (13) Sept. 14.
Signalling on the Cape Colony Railways. A. M. Tippett. (Abstract of Paper read before the British Assoc. for the Advancement of Science.) (73) Sept. 15.
New Design for Armoured Concrete Tunnels.* (12) Sept. 15.
Motor Railway Coach.* (12) Sept. 15.
New Locomotives: Natal Government Railways.* (12) Sept. 15.
Express Locomotives. A. A. H. Tokelcy. (12) Sept. 15.
Royal Train for India.* (11) Serial beginning Sept. 15.
Forging and Repairing Locomotive Motion Rods.* S. Uren. From Paper read before the National R.R. Blacksmiths' Assoc.) (15) Sept. 15.
The Chicago Freight Terminals of the Chicago & Northwestern.* (15) Serial beginning Sept. 15.
New Lackawanna Coal Piers.* (40) Sept. 15.
New Type of Bavarian Four-Cylinder Compound Locomotives.* Charles R. King. (40) Sept. 15.
The Treatment of the Ground Return in Railroad Systems. Albert B. Herrick. (72) Sept. 15.
Atlanta Northern Railway: The First Single-Phase Railway in the South.* (72) Sept. 15; (17) Sept. 16.
The Borinage (Belgium) Single-Phase Railway.* (17) Sept. 16.
Atlanta-Marietta Single-Phase Railway.* (27) Sept. 16.
The Grand Central Station Terminal Improvements.* (46) Sept. 16.
Rail Joints. (Rept. of Com. to Roadmasters' and M. of W. Assoc.) (18) Sept. 16.
Tandem Compound Freight Locomotive, N. P. Ry.* (18) Sept. 16.
Track Surface and Line. (Com. Rept. to the Roadmasters' and M. of W. Assoc.) (18) Sept. 16.
Slide Valve *vs.* Piston Valve. L. S. Allen. (From Paper read before the Traveling Engrs.' Assoc.) (15) Sept. 22.
New Works of the Louisville and Nashville Railroad.* (12) Sept. 22.
Lehigh Valley Ten-Wheel Locomotive.* (40) Sept. 22.
Ten-Wheel Passenger Locomotive, L. V. R. R.* (18) Sept. 23.
Modern Track Construction. A. Morrison. (From Paper read before the Roadmasters' and M. of W. Assoc.) (18) Sept. 23.
Operation of a Single-Track Railway under the Automatic Block System. H. M. Waite. (Abstract of Paper read before the Central Assoc. of Ry. Officers.) (13) Sept. 28.
The New Roof Shield for the Metropolitan Railway Tunnel of Paris.* R. Bonnin. (13) Sept. 28.
Union Highway Crossing Bell.* (15) Sept. 29.
New Freight Terminal at Cincinnati, of the Cincinnati, New Orleans and Texas Pacific.* (15) Sept. 29.
New Locomotives for Cuba.* (18) Sept. 30.
End Shocks in Car Service and Provision for Same in Car Framing.* (18) Sept. 30.
Recent Work on the Indiana Harbor R.R.* (14) Serial beginning Sept. 30.
Under-Contact Third Rail for the New York Central.* (25) Oct.
New Concrete Ties and Steel Ties.* (13) Oct. 5.
Steam Motor Cars on the Taff Vale Ry., England.* (13) Oct. 5.
Sixteen-Wheel Double Tank Locomotive for the Northern Railway of France.* (15) Oct. 6.
Le Chemin de Fer Électrique a Courant Monophasé, Washington, Baltimore et Annapolis.* A. Steens. (36) June 25.
Exposition de Liège: Locomotives a Marchandises et Deux Bogies Moteurs de la Compagnie du Nord.* R. Bonnin. (36) June 25.
Note sur un Appareil "Avance-Pétards" (Brevet Clayton & Co.).* D. M. Dupuis. (38) Sept.
Locomotives a l'Exposition de Saint-Louis.* (38) Sept.
Der Eisenbeton im Eisenbahnwesen.* (78) Sept.
Gewalzte Stahlräder für Eisenbahnwagen.* (50) Serial beginning Sept. 1.
Sicherung und Befestigung der Schienen auf Holzschwellen durch Verdübelung nach System Albert Collet.* Georg Schwabach. (53) Serial beginning Sept. 8.
Neue Spezialausführungen von Werkzeugmaschinen für Eisen- und Strassenbahnbau.* Heinr. Rupprecht. (82) Sept. 23.
Motorwagen im Eisenbahnbetriebe. A. Heller. (48) Serial beginning Sept. 23.
Fortschritte auf dem Gebiete der Elektrischen Zugförderung.* Friedrich Eichberg. (48) Sept. 23.

*Illustrated.

Railroad, Street.

Engines at the Power Stations, and at the St. Louis Exhibition.* Alfred Saxon. (75) Pt. 1, 1905.
The Present Electrical Equipment of the London County Council Tramways. J. W. Anson. (77) Sept.
Equipment of a Generating Station, with Special Reference to the Chelsea Station of the Underground Electric Railway.* Richard F. Chaffer. (77) Sept.
Progress on the Battery Tunnel, New York.* (14) Sept. 9.
New Standard 1905 Cars of the Chicago City Railway Co.* (72) Sept. 15; (17) Sept. 16.
The Walthamstow Electric Lighting and Tramways Undertakings.* (26) Sept. 15.
The Philadelphia Subway and Elevated Railroad.* (72) Sept. 15.
Power Equipment of the Philadelphia Rapid Transit Co.* (72) Sept. 15.
Distribution System of the Philadelphia Rapid Transit Co.* (72) Sept. 15.
Rapid Transit in Great Cities. William Barclay Parsons, M. Am. Soc. C. E. (Abstract of address delivered at Purdue Univ.) (19) Sept. 16.
Utilization of Gas Engines in Connection with Long Distance Electric Transmission. J. Martin. (24) Sept. 18.
Tramway Track Construction. Joseph Owen. (Abstract of Paper read before the Inc. Assoc. of Mun. and County Engrs.) (47) Sept. 23.
Way and Roadway Matters in Philadelphia (Street Railways).* (17) Sept. 23.
Department of Lines and Cables (in Philadelphia).* (17) Sept. 23.
Generation and Distribution of Power on the Philadelphia Rapid Transit System.* (17) Sept. 23.
Car Houses, Repair Shops and Rolling Stock.* (17) Sept. 23.
The Subway and Elevated Lines in Philadelphia.* (17) Sept. 23.
The Physical Analysis of an Electric Railway Property.* Albert B. Herrick. (17) Sept. 23.
New Power Plant of the Brooklyn Rapid Transit Company.* (27) Sept. 23.
The Single-Phase Railway in Practical Operation.* (27) Sept. 23.
New Westinghouse Railway Motor.* (27) Sept. 23.
Power Plant Improvements of the Philadelphia Rapid Transit System.* (14) Sept. 23.
The New Williamsburg Power Plant of the Brooklyn Rapid Transit Co.* (14) Sept. 23; (17) Sept. 23.
New Paint Conditions Existing in the New York Subway. Maximilian Toch. (Paper in *Journal* of the Soc. of Chemical Industry.) (14) Sept. 23.
An Emergency Track Brake for Street Railways. F. F. Bodler. (13) Sept. 28.
The Application of Gas Power to Electric Railway Service. (14) Sept. 30.
The Power Distributing System of the Boston Elevated Railway Company. C. H. Hile. (Paper read before the Amer. Ry. Mech. and Elec. Assoc.) (18) Sept. 30; (17) Sept. 30.
Reinforced Concrete Shops and Car Houses, Central Pennsylvania Traction Co., Harrisburg.* Mason D. Pratt, M. Am. Soc. C. E. (14) Sept. 30.
Notes on the Design of Large Gas Engines, with Special Reference to Railway Work.* Arthur West. (Paper read before the Amer. St. Ry. Assoc.) (17) Sept. 30.
The Application of Gas Power to Electric Railway Service.* J. R. Bibbins. (Paper read before the Amer. St. Ry. Assoc.) (17) Sept. 30.
The Single-Phase Railway System. Charles F. Scott. (Paper read before the Amer. St. Ry. Assoc.) (17) Sept. 30.
Electric Railway Equipment. W. B. Potter. (Paper read before the Amer. St. Ry. Assoc.) (17) Sept. 30.
Multiple Unit Systems of Train Control.* Hugh Hazleton. (Paper read before the Amer. Ry. Mech. and Elec. Assoc.) (17) Sept. 30.
The Series-Parallel Railway Controller.* W. A. Pearson. (Paper read before the Amer. Ry. Mech. and Elec. Assoc.) (17) Sept. 30.
Thermit Rail Welding.* G. E. Pellissier. (Paper read before the Amer. Ry. Mech. and Elec. Assoc.) (17) Sept. 30.
Joints and Track Construction in Philadelphia.* H. B. Nichols and C. B. Voynow. (Paper read before the Amer. Ry. Mech. and Elec. Assoc.) (17) Sept. 30.
The Cast-Welding of Rail-Joints.* Fred G. Simmons. (Paper read before the Amer. Ry. Mech. and Elec. Assoc.) (17) Sept. 30.
The Power Station.* Fred N. Bushnell. (Paper read before the Amer. Ry. Mech. and Elec. Assoc.) (17) Sept. 30.
An Emergency Track Brake.* F. F. Bodler. (Paper read before the Amer. Ry. Mech. and Elec. Assoc.) (17) Sept. 30.
Der einphasige Bahnmotor der Westinghouse-Gesellschaft.* Clarence Feldmann. (48) Sept. 16.

Sanitary.

Steam-heating in Connection with Condensing Engines.* Reginald Pelham Bolton. (70) Jan.
Combined Low Pressure and Vacuum Steam Heating Systems. Geo. D. Hoffman. (70) Sept.

*Illustrated.

Sanitary—(Continued).

Plumbing Fixtures in Mount Sinai Hospital, New York.* (70) Sept.
A Perfect Sewerage System for Rural Homes, Schools and Factories.* M. J. Quinn. (70) Sept.
Sanitary Engineering in the South and the Labor Question. J. N. Hazlehurst, M. Am. Soc. C. E. (Paper read before the Am. Soc. of Mun. Improvements.) (13) Sept. 21.
Sewage and Its Disposal.* H. Lemmoin-Cannon. (19) Sept. 23.
The Incineration of Municipal Waste. Howard G. Bayles. (60) Oct.

Structural.

Grain Pressures in Deep Bins. J. A. Jamieson. (5) Vol. 17, Pt. 2.
Fire-Proof Grain Storage Elevator for the Canadian Northern Railway, Port Arthur, Ont.* R. M. Pratt. (5) Vol. 17, Pt. 2.
The First Reinforced Concrete Building in the United States.* (67) Sept.
The Elastic Properties of Steel at High Temperatures.* Bertram Hopkinson, M. Inst. C. E., and F. Rogers. (11) Sept. 8; (47) Sept. 16.
A Reinforced Concrete Coal Pocket, Atlantic City Water Works.* Kenneth Allen, M. Am. Soc. C. E. (14) Sept. 16.
A Peculiar Pneumatic Caisson Wreck.* (14) Sept. 16.
Cement and Concrete Tests at the St. Louis Exposition.* Richard L. Humphrey, M. Am. Soc. C. E. (13) Sept. 21.
Settlement of Buildings Due to Tunneling. (14) Sept. 23.
Structural Details of the General Electric Co.'s Power House, Schenectady.* (14) Serial beginning Sept. 30.
Reinforced Concrete Shops and Car Houses, Central Pennsylvania Traction Co., Harrisburg.* Mason D. Pratt, M. Am. Soc. C. E. (14) Sept. 30.
Tests of Special Reinforced Concrete Construction in a Roundhouse.* (14) Sept. 30.
The Manufacture of Concrete Blocks and Their Use in Building Construction. H. H. Rice. (13) Oct. 5.
Nouvelles Ecoles à Autony (Seine).* E. Rivoalen. (35) Sept.
Notes on Concrete. C. E. P. Sankey. (11) Sept. 1.
La Fondation des Ouvrages en Terrains Vaseux. G. Espitallier. (33) Sept. 16.
Die Rolle der Haftfestigkeit im Verbundbalken.* Fritz v. Emperger. (79) Vol. 3.
Die Berechnung von Ringförmigen Fabrikschornsteinen in Eisenbeton.* Landmann. (81) Vol. 3, 1905.
Einiges über Erddruck. Adolf Francke. (81) Vol. 3, 1905.
Bericht über die Feuergefährlichkeit von Steinmaterial bei Treppen. (78) Serial beginning Sept.
Graphische Berechnung des Widerstandsmomentes von Eisenbeton-Platten und -Plattenbalken. P. Weiske-Kassel. (78) Sept.
Zur Frage der Sicherheit der Eisenbeton-Konstruktionen. E. Elwitz. (51) Sept. 20.
Die Eisenbeton-Konstruktionen in der Kreuzkirche zu Dresden. Th. Böhm. (51) Sept. 23.

Topographical.

Plane Table Surveying, U. S. Geological Survey. (14) Sept. 23.

Water Supply.

Waterworks Pumping Engines in the United States and Canada. John Barr. (75) Pt. 1, 1905.
Variable-Stroke Pump.* (11) Sept. 1.
Water Softening Plants.* (22) Sept. 1.
Experiments with Models of Dams.* (14) Sept. 9.
The Scioto River Storage Dam, at Columbus, Ohio. (14) Sept. 9.
Cost of Laying Water Pipe, Atlantic City, N. J. Kenneth Allen, M. Am. Soc. C. E. (13) Sept. 14.
The Truckee-Carson Irrigation Project.* Herbert J. Bennett. (46) Sept. 16.
The Bellinzona, Italy, Hydro-Electric Station.* S. Herzog. (27) Sept. 16.
The New Lardner's Point Pumping Station, Philadelphia.* (14) Sept. 16.
Method and Cost of Concreting Jerome Park Reservoir, New York City.* Halbert P. Gillette, M. Am. Soc. C. E. (13) Sept. 21.
Purification of Water by Copper Sulphate. Daniel D. Jackson. (Abstract of Paper read before the Am. Soc. of Mun. Improvements.) (13) Sept. 21; (60) Oct.
Pumping Engines of the Budapest Waterworks.* (12) Sept. 22.
A 75,000 Gallon Concrete Steel Cistern. Edward Godfrey. (13) Sept. 28.
Movable Dam and Lock of the Rice Irrigation and Improvement Association, Mermentau River, La.* (13) Sept. 28.
Power Capacity of a Running Stream without Storage. (14) Sept. 30.

*Illustrated.

Water Supply—(Continued).

The Montreal Water Works. George Janin. (60) Oct.
Régulateur Automatique de Débit pour Bassins Filtrants. Système Didelon et Cie.* (36) June 25.
Le Nouveau Clapet Système Gutermuth.* (36) July 25.
Les Installations Hydro-Electriques de la Haute Italie.* G. Semenza. (32) Aug.
Clarification et Stérilisation des Eaux par le système Américain.* Paul Raulin. (33) Sept. 9.
Effondrement de la Couverture d'un Réservoir d'Eau en Construction à Madrid.* (33) Sept. 23.
Les Pompes-Turbines Multicellulaires Actuelles.* (33) Sept. 23.

Waterways.

Work of the Hydrographic Branch of the United States Geological Survey in New England and a Discussion of the Methods Used for Estimating Stream Flow.* H. K. Barrows. (1) July.
The Improvement of the Delaware River and Harbor and the Landing Facilities of the Port of Philadelphia.* George S. Webster. (3) Sept.
A Submarine Rock Excavator.* (14) Sept. 16.
Preliminary Work on the Panama Canal. John F. Wallace. (9) Oct.
La Nouveau Phare de Beachy-Head.* (36) June 25.
Les Dragues.* A. Baril. (37) Aug.
Moyens de Faire Franchir les Grandes Chutes par les Bateaux de Navigation Intérieure. A. de Bovet. (32) Aug.
Outillage de la Nouvelle Entrée du Port de Saint-Nazaire.* Leon Griveaud. (35) Serial beginning Sept.
Verbesserung des Hafens von Valparaiso.* Horn. (From *Zentralblatt der Bauverwaltung.*) (78) Sept.

*Illustrated.

Vol. XXXI. NOVEMBER, 1905. No. 9.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

November 1st, 1905.—The meeting was called to order at 8.40 P. M.; Vice-President E. Kuichling in the chair; Chas. Warren Hunt, Secretary; and present, also, 109 members and 29 guests.

The minutes of the meetings of October 4th and 18th, 1905, were approved as printed in the *Proceedings* for October, 1905.

A paper by Ernst F. Jonson, Assoc. M. Am. Soc. C. E., entitled "The Theory of Frameworks with Rectangular Panels, and its Application to Buildings which have to Resist Wind," was presented by the author, and discussed by H. T. Forchhammer, Assoc. M. Am. Soc. C. E., and the author.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

Charles Abel Bowman, Syracuse, N. Y.
Walter William Colpitts, Kansas City, Mo.
Ernest Payson Goodrich, New York City.
Alexander McClure Lupfer, Spokane, Wash.
Paul Maningham Norboe, Hanford, Cal.
Hastings FitzEdward Peet, Bloemfontein, South Africa.
Robert Dee Stewart, Laramie, Wyo.

As Associate Members.

John Lee Allen, Chicago, Ill.
Alexander Floyd Armstrong, Manila, Philippine Islands.
George Washington Bond, Jr., Hoboken, N. J.
George Herbert Brazer, Boston, Mass.
Samuel Coughlin Brown, Jersey City, N. J.
John Thomas Burke, Minidoka, Idaho.
Maurice Charles Couchot, San Francisco, Cal.
Wilton Joseph Darrow, New York City.
Herbert Luther Dunn, Hopedale, Mass.
Nelson Andrew Eckart, San Francisco, Cal.
Howell Tracy Fisher, New York City.
Albert Bertram Hager, New York City.
Sigvald Johannesson, New York City.
Isaac Henry Kirby, New York City.
Allen Boyer McDaniel, New York City.
Courtland Nixon, Chattanooga, Tenn.
Harradon Sterling Smith, Wilkes-Barre, Pa.
James Smith, Coatzacoalcos, Mexico.
Williford Harry Terrell, Greensboro, N. C.
John David Twiggs, Jr., Augusta, Ga.
Francis Repetti Weller, Washington, D. C.
Benjamin Franklin Welton, New York City.

As Associate.

Charles Arthur Holden, Hanover, N. H.

The Secretary announced the transfer of the following candidates, by the Board of Direction, on October 31st, 1905:

From Associate Member to Member.

Clarence Morton Ayres, Holt, Ala.
Jaquelin Marshall Braxton, Key West, Fla.

George Hallett Clark, New York City.
Frederick Luther Ford, Hartford, Conn.
Charles Pope Howard, Charleston, W. Va.
Charles Lincoln Keller, Chicago, Ill.
Walter Frank Whittemore, Hoboken, N. J.

The election of the following candidates, by the Board of Direction:

As Juniors.

On October 3d, 1905:

Adolph DeHaas, Oglethorpe, Ga.
Verne Le Roy Havens, Scottsbluff, Nebr.
Ralph Russell Tinkham, Ann Arbor, Mich.

On October 31st, 1905:

Edward Fryling Black, New Orleans, La.
Lucien Hoguet Blythe, Rutherford, N. J.
Ernest John Crisp, Barnesville, Ohio.
Walter Taubert Derleth, New York City.
Williard Rea Ewing, Great Falls, Mont.
Henry Haydock Garrigues, Wall, Pa.
Walter Joseph Gillen, Croton Falls, N. Y.
Diedrich William Krellwitz, Toronto, Ont., Canada.
Lyle Antrim Whitsit, Springfield, Idaho.
John Root Wortham, New York City.

The Secretary announced the death of Frank Lewis Fales, elected Associate Member April 6th, 1904; died October 5th, 1905.

Adjourned.

November 15th, 1905.—The meeting was called to order at 8.35 P. M.; Vice-President E. Kuichling in the chair; Chas. Warren Hunt, Secretary; and present, also, 110 members and 24 guests.

A paper by C. A. P. Turner, M. Am. Soc. C. E., entitled "The Ferry Bridge Across the Ship Canal at Duluth, Minnesota," was presented by the Secretary.

The Secretary announced the following deaths:

George Wallace Enos, elected Junior March 6th, 1900; died November 2d, 1905.

David Maxson Greene, elected Member May 20th, 1868; died November 9th, 1905.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

October 31st, 1905.—Vice-President Kuichling in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Bissell, Bowman, Craven, Deyo, Ellis, Gowen, Knap, N. P. Lewis, and Osgood.

It was decided to hold the Thirty-eighth Annual Convention at The Frontenac, Thousand Islands, New York, during the last week in June, 1906.

Applications were considered and other routine business transacted.

Six Associate Members were transferred to the grade of Member, and ten candidates for Junior were elected.

Adjourned.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, December 6th, 1905.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, entitled "A New Graving Dock at Nagasaki, Japan," by Naoji Shiraishi, M. Am. Soc. C. E., will be presented for discussion.

This paper was printed in *Proceedings* for October, 1905.

Wednesday, December 20th, 1905.—8.30 P. M.—At this meeting a paper, entitled "The Inspection of Treatment for the Protection of Timber by the Injection of Creosote Oil," by H. R. Stanford, M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings*.

Wednesday, January 3d, 1906.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, entitled "The Position of the Constructing Engineer, and his Duties in Relation to Inspection and the Enforcement of Contracts," by Albert J. Himes, M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings*.

ANNUAL MEETING.

The Fifty-third Annual Meeting will be held at the Society House, on Wednesday and Thursday, January 17th and 18th, 1906. The Business Meeting will be called to order at 10 o'clock on Wednesday morning. The Annual Reports will be presented, officers for the ensuing year elected, members of the Nominating Committee appointed and a proposed Amendment to the Constitution discussed.

The arrangements for the excursions and entertainments will be announced later.

NOMINATING COMMITTEE.

The Constitution provides that, at the Annual Meeting of each year, seven Corporate Members, not officers of the Society, one from each of the geographical districts into which the Society is divided for this purpose, shall be appointed by the meeting, to serve two years.

The usual blank request for suggestions as to representatives of each district, for presentation to the meeting, will soon be mailed to Corporate Members.

PRIVILEGES OF ENGINEERING SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

Members of the American Society of Civil Engineers will be welcomed by the following Engineering Societies, both to the use of their Reading Rooms and at all meetings:

North of England Institute of Mining and Mechanical Engineers, Newcastle-upon-Tyne, England.

Society of Engineers, 17 Victoria Street, Westminster, S. W., England.

American Institute of Mining Engineers, 99 John Street, New York City.

Boston Society of Civil Engineers, 715 Tremont Temple, Boston, Mass.

Civil Engineers' Club of Cleveland, 689 The Arcade, Cleveland, Ohio.

St. Louis Engineers' Club, 3817 Olive Street, St. Louis, Mo.

Engineers' Club of Philadelphia, 1122 Girard Street, Philadelphia, Pa.

Engineers' Society of Western Pennsylvania, 410 Penn Avenue, Pittsburg, Pa.

Western Society of Engineers, 1737 Monadnock Block, Chicago, Ill.

Louisiana Engineering Society, 604 Tulane-Newcomb Building, New Orleans, La.

Engineers' Club of Central Pennsylvania, Corner, Second and Walnut Streets, Harrisburg, Pa.

Engineers' and Architects' Club of Louisville, Ky., 303 Norton Building, Fourth and Jefferson Streets, Louisville, Ky.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be

performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

LOCAL ASSOCIATIONS OF MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

San Francisco, Cal.

October 21st, 1905.—The third regular meeting of the San Francisco Association of Members, Am. Soc. C. E., was held; W. W. Harts in the chair; F. Riffle, Secretary; and present, also 19 members and 6 guests.

The Secretary read a discussion by Mr. L. J. Le Conte, on Mr. Parmley's paper entitled "The Walworth Sewer, Cleveland, Ohio."

Messrs. A. L. Adams and Edwin Duryea, Jr., discussed orally Mr. K. F. Cooper's paper entitled "An Example of the Legitimate Use of Water for Domestic Purposes."

Mr. P. E. Harroun presented a paper entitled "Test of a Three-Stage Direct-Connected Centrifugal Pumping Unit," and the Secretary read a discussion by Mr. John Richards. The paper was discussed orally by Messrs. Hicks, Marx, Stout, Adams, Hunt, Wing, Derleth and the author.

ACCESSIONS TO THE LIBRARY.

From October 11th to November 6th, 1905.

DONATIONS.*

THE DESIGN AND CONSTRUCTION OF METALLIC BRIDGES.

By William H. Burr, M. Am. Soc. C. E., and Myron S. Falk, Assoc. M. Am. Soc. C. E. Cloth, 9 x 6 in., illus., 13 + 532 pp. New York, John Wiley & Sons, 1905. $5.

The preface states that this book is based upon the ninth edition of "The Stresses in Bridge and Roof Trusses, Arched Ribs, and Suspension Bridges," by one of the authors of this volume. That work has been so thoroughly rewritten, and such a large amount of new matter has been introduced, that a new title has been adopted. It has been the intention of the authors to prepare a comprehensive book covering all types of trusses used in American bridge practice, or, at least, all trusses forming the basis of that practice. In conformity with this plan, the most advanced methods of stress computations, as well as those that are older have been used. The methods of influence lines and of deflections are used in the treatment of swing-bridges as well as the more common procedure with the theorem of three moments. There will also be found a short chapter setting forth the main features of the application of the principle of least work to the determination of stresses in trusses. It is stated that the graphic theory is but little used in this book. There are name and subject indexes, covering nine pages.

FOWLER'S ELECTRICAL ENGINEER'S YEAR BOOK AND DIRECTORY OF LIGHT, POWER AND TRACTION STATIONS, 1906.

Leather, 6 x 4 in., 643 pp. Manchester, Eng., Scientific Publishing Company, 1905. One shilling, nine pence.

The preface states that this edition contains fifty pages of entirely new matter. Among the more substantial additions, it is stated, there will be found a lengthy section dealing with the designing of alternators, and another dealing with steam turbines and turbo-generators. Additional information is given on power and cost of electrical distribution, and some notes on insulating material for electrical machines. The alterations which have been made during the past year in the Board of Trade rules for lighting and traction are noted, and the new Home Office Regulations for the use of electricity in mines have been included. There is an index of fourteen pages.

HIGH-TENSION POWER TRANSMISSION.

A Series of Papers and Discussions Presented at the Meetings of the American Institute of Electrical Engineers, under the Auspices of the Committee on High-Tension Transmissions. Cloth, 9 x 6 in., 466 pp., illus. New York, McGraw Publishing Company, 1905. $3.

A Committee on High-Tension Transmission was appointed on September 26th, 1902, for the purpose of collecting data respecting present practice in electrical transmission at high voltage, and of presenting a report indicating the successful methods which are now in operation, in such a form as to be of immediate value to electrical engineers. It was within the scope of the Committee to secure data upon line construction, insulators, insulator-pins, and the like, and the conditions of operation at different voltages and under different climatic conditions; to investigate methods of testing insulators and to indicate the method or methods which in its judgment are superior. Also to ascertain the methods employed for voltage regulation, the conditions attendant upon the switching of high-tension circuits, and to collect data respecting lightning and static disturbances and the use of grounded protective wires. This volume comprises the work accomplished by the Transmission Committee along the lines laid down. It includes the introductory papers, with the discussions which took place upon them, and the results obtained from the lists of questions sent out. There are indexes of subjects and authors covering eight pages.

*Unless otherwise specified, books in this list have been donated by the publishers.

THE ELEMENTS OF GEODETIC ASTRONOMY FOR CIVIL ENGINEERS.

By H. C. Lord. Cloth, 7 x 5 in., 136 pp. Columbus, Ohio, Comet Press, 1904. $1.50 net. (Donated by the author.)

The preface states that in this book the author puts in permanent form his presentation of the subject to the students of civil engineering at the Ohio State University. In the derivation of formulas, the author has sought directness of method rather than elegance of mathematical analysis. In the numerical examples, taken from observations made at the Emerson McMillin Observatory, he has aimed to furnish the student with models of correct forms for note-book record as well as of correct forms for reduction sheets. He has placed much emphasis upon the theodolite, as the instrument of the engineer. The Contents are: Fundamental Co-ordinates; Transformation of Co-ordinates; Refraction and Parallox; Time; Reduction of Star Places; The Sextant; The Theodolite; Azimuth; Time, Altitudes; Latitude; The Astronomical Transit; The Zenith Telescope; Tables.

PERFORMANCE OF AUTOMATIC BLOCK SIGNALS UNDER UNFAVORABLE CONDITIONS.

By H. S. Balliet. Paper, 8 x 5 in., 42 pp. New York, The Railroad Gazette. 50 cents.

This book is composed of a series of articles which first appeared in the *Railroad Gazette*. It treats of the various disturbances in the automatic operation of railroad block signaling apparatus, their causes and the best methods of preventing or avoiding them. The principal chapter headings are: Wood and Iron Enclosures and the Effects of Frost; Relays and their Enclosures; Operating and Controlling Mechanisms; Batteries and their Enclosures. There are seventeen illustrations.

A BRIEF COURSE IN THE CALCULUS.

By William Cain, M. Am. Soc. C. E. Cloth, 8 x 5 in., 10 + 280 pp. New York, D. Van Nostrand Company, 1905. $1.50 net. (Donated by the author.)

The preface states that this work is intended, not only for the class-room, but for the student without a teacher, who hopes to acquire some knowledge of the working principles of the Calculus in a short time. The aim has been to write a book for the beginner that should be simple, clear, and logical. The topics selected are mainly those involving fundamental principles, and these have been treated more fully than usual, and a number of illustrative, worked examples have been added.

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BY PURCHASE.

Concrete-Steel; a Treatise on the Theory and Practice of Reinforced Concrete Construction. By W. Noble Twelvetrees. London and New York, Whittaker and Company, 1905.

Report of the Eighth Geographic Congress, Held in the United States, 1904. Washington, Government Printing Office, 1905.

Copper Mines of Lake Superior. By T. A. Rickard. New York and London, Engineering and Mining Journal, 1905.

Indian Storage Reservoirs with Earthen Dams: Being a Practical Treatise on their Design and Construction. By William Lumisden Strange. London, E. & F. N. Spon, Ltd.; New York, Spon & Chamberlain, 1904.

Shipping World Year Book, 1905. Edited by Evan Rowland Jones. New York, The Derry-Collard Co.

Steam Turbines with an Appendix on Gas Turbines and the Future of Heat Engines. By A. Stodola; Authorized Translation from the Second Enlarged and Revised German Edition by Louis C. Loewenstein. New York, D. Van Nostrand Company; London, Archibald Constable and Company, Ltd., 1905.

Public Health Papers and Reports presented at the Annual Meeting of the American Public Health Association. Vols. 18, 20–24, 28, 29, 30.

Permanent International Association of Navigation Congresses. X. Congress, Milan, 1905. Reports. 103 pam. Brussels, Printing Office of the Public Works (Co. Ltd.), 1905.

Report to the Royal Commission on London Traffic by the Advisory Board of Engineers, Vol. VII. London, Wyman and Sons, Limited, 1905.

SUMMARY OF ACCESSIONS.

October 11th to November 6th, 1905.

Donations (including 12 duplicates and 5 numbers completing volumes of periodicals)	255
By purchase	119
Total	374

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DEATHS.

ENOS, GEORGE WALLACE. Elected Junior, March 6th, 1900; died November 2d, 1905.

FALES, FRANK LEWIS. Elected Associate Member, April 6th, 1904; died October 5th, 1905.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(October 8th to November 4th, 1905.)

NOTE.—*This list is published for the purpose of placing before the members of the Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal,* Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
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(3) *Journal,* Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal,* Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions,* Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly,* Columbia Univ., New York City, 50c.
(7) *Technology Quarterly,* Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator,* Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine,* New York City, 25c.
(10) *Cassier's Magazine,* New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News,* New York City, 15c.
(14) *The Engineering Record,* New York City, 12c.
(15) *Railroad Gazette,* New York City, 10c.
(16) *Engineering and Mining Journal,* New York City, 15c.
(17) *Street Railway Journal,* New York City. Issues for first Saturday of each month 20c., other issues 10c.
(18) *Railway and Engineering Review,* Chicago, Ill., 10c.
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(23) *Bulletin,* American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal,* New York City, 10c.
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(27) *Electrical World and Engineer,* New York City, 10c.
(28) *Journal,* New England Water-Works Assoc., Boston, $1.
(29) *Journal,* Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique,* Brussels, Belgium.
(31) *Annales de l'Assoc. des Ing. Sortis des Ecoles Speciales de Gand,* Brussels, Belgium.
(32) *Memoires et Compte Rendu des Travaux,* Soc. Ing. Civ. de France, Paris, France.
(33) *Le Genie Civil,* Paris, France.
(34) *Portefouille Economique des Machines,* Paris, France.
(35) *Nouvelles Annales de la Construction,* Paris, France.
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(39) *Railway Master Mechanic,* Chicago, Ill., 10c.
(40) *Railway Age,* Chicago, Ill., 10c.
(41) *Modern Machinery,* Chicago, Ill., 10c.
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(49) *Zeitschrift für Bauwesen,* Berlin, Germany.
(50) *Stahl und Eisen,* Düsseldorf, Germany.
(51) *Deutsche Bauzeitung,* Berlin, Germany.
(52) *Rigasche Industrie-Zeitung,* Riga, Russia.
(53) *Zeitschrift,* Oesterreichischer Ingenieur und Architekten Verein, Vienna, Austria.

(54) *Transactions,* Am. Soc. C. E., New York City, $5.
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(57) *Colliery Guardian,* London, England.
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(81) *Zeitschrift für Architektur und Ingenieurwesen,* Wiesbaden, Germany.
(82) *Dinglers Polytechnisches Journal,* Berlin, Germany.
(83) *Progressive Age,* New York City, 15c.

LIST OF ARTICLES.

Bridge.

Assisted Cantilever Method as Applied to the Erection of Permanent Steel Work for the Western Maryland Railroad, Cumberland Extension. (8) July.
Widening of Grosvenor Bridge; L., Brighton and South Coast Railway.* (21) Oct.
Protection of Bridge Floors against Corrosion.* (21) Oct.
The Havre de Grace Bridge of the Pennsylvania Railroad.* (40) Oct. 6.
Recent Bridge Work on the Nickel Plate.* Albert J. Himes. (15) Oct. 13.
Erecting a Bridge Truss with a Gin Pole.* (14) Oct. 14.
The Use of Derrick Cars in Erecting Long Girders.* (14) Oct. 14.
The Key West Extension of the Florida East Coast Railway (viaduct construction). (13) Oct. 19.
The Concrete Railway Viaduct at Cannington.* (14) Oct. 21.
A Through-Truss Short-Span Double-Track Bridge.* (14) Oct. 21.
The New Croton Dam Bridge.* (14) Oct. 21.
Steel Railroad Bridges. (Rept. of Com. on Steel Bridges of the Assoc. of Ry. Supts. of Bridges and Buildings.) (14) Oct. 21.
Reconstruction of Viaduct Foundations with Concrete Piles: Norfolk and Western Ry.* (13) Oct. 26.
Reinforcing the Poughkeepsie Bridge. (14) Oct. 28.
Reinforced Concrete Structures for Railroads. (14) Oct. 28.
Zur Theorie der Versteiften Hängebrücken mit Drei Oeffnungen.* V. v. Friedrichs. (52) Sept. 15.
Berechnung Doppelt Bewehrter oder mit Profileisen Versehener Betoneisenträger.* (78) Serial beginning Oct.
Die Eisenbahnbrücke über die Havel bei Brandenburg.* Karl Bernhard. (48) Oct. 14.

Electrical.

Test of Electric Passenger Elevators in the Park Row Building, New York City. G. A. Balz, G. I. Branch and T. E. Landvoigt. (8) July.
On the Ratio between Thickness and Dielectric Strength of High-Tension Insulating Materials. C. Kinzbrunner. (73) Serial beginning Sept. 29.
The Alternating Current Generator. David B. Rushmore. (3) Oct.
Insulating Paints.* Arthur B. Weeks. (72) Oct.
The Utah Light & Railway Co.* O. A. Honnold. (72) Oct.
Some Experiences with Lightning Protective Apparatus.* Julian C. Smith. (42) Oct.
Note on Lightning-Arresters on Italian High-Tension Transmission Lines.* Philip Torchio. (42) Oct.

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*Illustrated.

Electrical—(Continued).

Electric Motors and Their Applications.* W. Edgar Reed. (58) Oct.
The Insulation of Overhead Lines.* W. B. Esson. (12) Serial beginning Oct. 6.
A 20,000-Volt Power Transmission Scheme.* (73) Oct. 6.
Waterside Station No. 2 of the New York Edison Company.* (73) Serial beginning Oct. 6.
New Steam Turbine Power Plant of the Detroit Edison Company.* (14) Oct. 7.
The Radcliffe Power Station of the Lancashire Electric Power Company. (22) Oct. 13.
The Moscow-Road Sub-Station of the Metropolitan Electric Supply Co.. (73) Oct. 13.
Lancashire Electric Power Co.'s System of Generation and Distribution.* (73) Oct. 13.
The Design of Multiple-Coil Windings.* Charles R. Underhill. (27) Oct. 14.
Overhead Construction.* Robert N. Tweedy. (26) Serial beginning Oct. 20.
The New Ferranti Switch Gear.* (73) Oct. 20.
A Proposed Phase Regulator and Its Applications.* P. G. Watmough, Jr. (27) Oct. 21.
Development of the Necaxa, Mexico. Water Power.* (27) Oct. 28.
Dynamo Heating Time Constants. A. Press. (27) Oct. 28.
Electric Storage Battery Engineering.* J. Lester Woodbridge. (10) Nov.
L'Ascenseur Electrique du Bürgenstock (Suisse).* P.Chiguaterie. (33) Oct. 21.
Le Résau de Distribution Electrique de la Ville de Hambourg.* (33) Oct. 21.

Marine.

A New Type of Marine Fire-Tube Boiler. (12) Oct. 6.
The Electric Steering Gear of the Turbine Steamer *Manxman.** (19) Oct. 7.
The Action of Capped Armour-Piercing Shell.* Eugen Kodar v. Thurnwerth. (Tr. from *Mitteilungen aus dem Gebiete des Seewesens.*) (22) Oct. 20.
Steam Turbines as Applied to Ocean Liners. J. Harvard Biles. (Paper read before the British Assoc. for the Advancement of Science.) (13) Oct. 26.
Schlick's Pallograph.* (82) Serial beginning Oct. 14.

Mechanical.

Method of Computing the Amount of Superheating of Steam in the Cylinder of a Superheated Steam Engine. D. S. Jacobus. (8) July.
Hydraulic Pressing, Stamping, and Forging Machinery. F. W. Steele. (Abstract of Paper read before the Liverpool Eng. Soc.) (47) Serial beginning Sept. 30.
The New Manufacturing Plant of the B. F. Sturtevant Co., Hyde Park, Mass.* (70) Oct.
Modern Boiler House Equipment.* Franz Koester. (72) Oct.
The Old and the New Works of the Portsea Island Gaslight Company.* (66) Serial beginning Oct. 3.
The Central Heating and Electric Lighting Station at Dresden.* (12) Serial beginning Oct. 6.
Electric Charging Machinery for Gas Retorts.* (11) Oct. 6.
Lime Burning with Producer Gas.* (14) Oct. 7.
Steam and Gas-Engine Breakdowns. Michael Longridge. (47) Serial beginning Oct. 7.
The Dessau Vertical Retort-Settings and the Appolt Coke-Oven of Twenty-two Vertical Retorts at the Blanzy Mines.* M. Marle. (Tr. from *Bulletin* de la Société de l'Industrie Minérale.) (66) Oct. 10.
The Henry R. Worthington Hydraulic Works, at Harrison, N. J. (20) Oct. 12.
Belt Coal Conveyors.* Francis H. Davies. (26) Oct. 13.
Messrs. Richardsons, Westgarth and Co.'s Steam-Turbine Works, Hartlepool.* (11) Oct. 13.
The New Shops of the Watson-Stillman Co.* (14) Oct. 14.
Lignite Producer-Gas Plants.* Alfred Gradenwitz. (19) Oct. 14.
Natural and Induced Draught. John W. Cobb. (Abstract of Paper in *Journal* Soc. Chem. Ind.) (16) Oct. 14.
Trials of a 500 B. H. P. Diesel Oil Engine. Michael Longridge. (47) Serial beginning Oct. 14.
Benches with Vertical Retorts at the Works of the Deutsche Continental Gas Gesellschaft in Dessau, Germany.* J. Bueb. (Tr. from the German.) (83) Oct. 16.
The Analysis of Raw and Spent Lime (in gas manufacture). H. Leicester Greville. (66) Oct. 17.
The Expansion of Wet Steam. Robert H. Smith. (12) Oct. 20.
Dissolved Acetylene. (12) Oct. 20.
The Works of the Kosmos Portland Cement Co. (14) Oct. 21.
A Discussion of Large Gas Engines. (14) Oct. 21.
The Removal of Naphthaline from Coal Gas. Alfred H. White and David H. Clary. (Paper read before the Michigan Gas Assoc.) (24) Oct. 23.
The Power Plant for the New Wanamaker Store, Philadelphia.* (14) Oct. 28.
A Producer-Gas Power Plant. (14) Oct. 28.

*Illustrated.

Mechanical—(Continued).

Steam Boilers of the Past and the Present.* Egbert Pomeroy Watson. (9) Nov.
A Study of the Corrosion of Condenser Tubes.* A. Humboldt Sexton. (9) Nov.
Locomotive Cranes as Labour Savers.* Lewis Glasgow Howlett. (10) Nov.
Designing Machinery to Facilitate Repairs. Joseph Horner. (10) Nov.
Conversion of Heat into Work by Adiabatic Expansion. A. M. Levin. (64) Nov.
Design, Construction and Application of Large Gas Engines in Europe.* Franz Erich Junge. (64) Serial beginning Nov.
Long Steam Line Construction. G. W. Barager. (64) Nov.
The Abatement of the Smoke Nuisance. R. P. King. (Paper read before the League of Amer. Municipalities.) (60) Nov.
Tar Burning in Gas and Electric Plants.* R. A. Field. (83) Serial beginning Nov. 1.
Gas Tars. P. W. Prutzman. (Paper read before the Pacific Coast Gas Assoc.) (83) Nov. 1.
Ludlow's First Successful Flight.* (46) Nov. 4.
Tour de 2m. 745 de Hauteur de Pointes.* J. Garnier. (33) Sept. 30.
Influence des Enveloppes sur le Fonctionnement des Machines à Vapeur.* F. Hofer. (33) Oct. 7.
Die Bewegungsverhältnisse von Steuergetrieben mit unrunden Scheiben.* W. Hartmann. (48) Serial beginning Sept. 30.
Schwimmkran von 60t. Tragfähigkeit.* W. Pickersgill. (48) Sept. 30.
Geschichte und Fabrikation Gezogener Gasrohre.* Anton Bousse. (50) Serial beginning Oct. 1.
Einfluss des Rauchschiebers auf den Gang der Feuerung. N. Peters. (80) Oct. 17.
Untersuchung der Gasströmung in der Laval-Düse in dem Falle, als der Druck an der Engsten Stelle Höher als der Kritische Ist.* Adolf Langrod. (53) Serial beginning Oct. 20.
Ein Beitrag zur Beurteilung der Säeorgane an Drillmaschinen.* Gustav Fischer. (82) Oct. 21.
Die Genaue und die Angenäherte Schwungradermittlung.* R. Proell. (48) Oct. 21.

Metallurgical.

Cleaning Blast-Furnace Gas.* Axel Sahlin. (10) Oct.
The Huntington-Heberlein Process from the Hygienic Standpoint. A. Biernbaum. (Tr. from the *Zeitschrift für das Berg- Hutten- und Salinenwesen im Preuss. Staate.*) (16) Oct. 14.
The Tonopah Mining Co.'s Mill.* S. A. Worcester. (16) Oct. 14.
The Kjellin Electric Steel Furnace.* (20) Oct. 19.
The Carmichael-Bradford Process.* (16) Oct. 28.
Lead-Smelting at Monteponi, Sardinia.* Erminio Ferraris. (Tr. from *Oest. Zeit. f. Berg- und Hüttenwesen.* (16) Oct. 28.
Beiträge sur Kenntnis der Zwei Kohlenstofformen im Eisen "Temperkohle" und "Graphit." F. Wüst and C. Geiger. (50) Serial beginning Oct. 1.

Mining.

Width of Room and Pillar (in Mines).* (45) Oct.
Electric Hoist at the Tiremande Colliery.* Emile Guarini. (45) Oct.
Nouvelles Expériences sur les Lampes de Sureté Faites à la Station d'Essais de Frameries (Belgique).* H. Schmerber. (33) Serial beginning Oct. 21.

Miscellaneous.

The Relation of the Engineer to the Architect. (14) Oct. 14.
The College Education of the Engineer. William Kent. (Presidential address before the Technology Club, Syracuse, N. Y.) (13) Oct. 19.

Municipal.

Terre Haute Brick and Asphalt Streets.* (76) Oct.
Municipal Franchises. (Rept. of Com. of Amer. Soc. of Mun. Impvts.) James Owen and John R. Barlow. (60) Nov.
Specifications as to Effect of Water upon Asphalt. Andrew Rosewater. (60) Nov.

Railroad.

Electrification of Railways.* H. W. Wilson. (Paper read before the Liverpool Eng. Soc.) (47) Serial beginning Sept. 30.
New 4-4-0 Type Locomotives Caledonian Railway.* (21) Oct.
Bow to East Ham Widening; London, Tilbury and Southend Railway.* Chas. S. Lake. (21) Serial beginning Oct.
The Utah Light & Railway Co.* O. A. Honnold. (72) Oct.
Compressed Air Locomotives in the Anaconda Copper Mining Company's New Reduction Works at Anaconda, Montana, U. S. A.* C. B. Hodges. (10) Oct.

*Illustrated.

Railroad—(Continued).

The Quality and Utility of Solid, Flexible and Hollow Staybolts, in Iron and Copper. John Livingstone. (65) Oct.
Compound Mogul with Superheater: M., St. P. & S. St. M. Ry.* (39) Oct.
Rail-Motor Carriages; London and North-Western Railway.* (21) Oct.
Six-Coupled Passenger Locomotive, London and North-Western Railway.* (12) Oct. 6.
Compound Articulated Locomotive for the Northern Railway of France.* H. W. Hanbury, Assoc. M. Inst. C. E. (11) Oct. 6.
Some Through Plate-Girder Bridges, New York, New Haven & Hartford R. R.* (14) Oct. 7.
Slide *versus* Piston Valves for Locomotives. L. S. Allen. (Abstract of Paper read before the Travelling Engineers' Assoc.) (47) Oct. 7.
South Louisville Shops, Louisville & Nashville R. R.* (18) Oct. 7.
Balanced Compound for Pennsylvania Lines.* (18) Oct. 7; (40) Oct. 13.
The Cost of Stopping Trains, Compared with the Cost of Maintenance, Operation and Inspection of Interlocking Plants.* J. A. Peabody. (Paper read before the Ry. Signal Assoc.) (13) Oct. 12; (15) Oct. 13; (40) Oct. 13; (18) Oct. 14.
East Ivory Car Ferry of the Missouri Pacific.* (15) Oct. 13.
Lackawanna Locomotive with Schenectady Superheater.* (15) Oct. 13.
Electric Circuits for Manual Block Signal Systems.* (Com. Rept. of Ry. Signal Assoc.) (18) Oct. 14.
Completion of Twin Tunnels under Hudson River.* (19) Oct. 14.
Electric Traction for Railroad Service. J. A. Shaw. (Paper read before the Can. Ry. Club.) (14) Oct. 14.
Niagara Electric Power for Steam Railways of Western New York.* (18) Oct. 14.
Repair Shops of the Aurora, Elgin & Chicago Ry.* (18) Oct. 14.
Articulated Locomotives.* Chas. S. Lake. (47) Oct. 14.
The Design, Construction, Efficiency and Maintenance of Signal Lamps. (Rept. of Com. of Ry. Signal Assoc.) (13) Oct. 19.
Prairie Type Engine for the Chicago, Burlington & Quincy.* (15) Oct. 20.
Terminal Improvements of the New York Central & Hudson River in New York.* G. R. Wadsworth. (15) Oct. 20.
Locomotives at the Liége Exhibition.* H. W. Hanbury. (11) Oct. 20.
"Prairie" Type Locomotive: Lake Shore and Michigan Southern Railroad.* (12) Oct. 20.
London & Northwestern Steam Motor Cars.* (40) Oct. 20.
Rubber-Covered Wire (for signals). (Rept. of Com. to the Ry. Signal Assoc.) (15) Oct. 20.
The European Single-Phase Railways.* (27) Oct. 21.
The Tauern Railroad from Schwarzach to Bad Gastein.* Emil S. Fischer. (18) Oct. 21.
The Toledo & Indiana Railway.* (17) Oct. 21.
An Unprecedented Railway Situation. (New York, New Haven and Hartford R. R.) Frank J. Sprague. (17) Oct. 21.
Concrete Building Construction, Including Platforms. (Railroad Work.) (Rept. of Com. of Assoc. of Ry. Supts. of Bridges and Buildings.) (13) Oct. 26.
Rebuilding the Cairo Division of the Big Four.* (15) Oct. 27.
Heavy Passenger Locomotive for Lackawanna.* (40) Oct. 27.
Tests of the New Westinghouse Brake Fixtures on the Lake Shore & Michigan Southern.* (40) Oct. 27; (18) Oct. 28.
The Berlin-Zossen Tests of 1902.* (17) Oct. 28.
A Central Compressed Air Power Plant for Heavy Railroad Construction.* Lucius I. Wightman. (14) Oct. 28.
East Moline Locomotive Shops: Rock Island System. (25) Nov.
50-Ton Steel Twin Hopper Gondola Car.* (25) Nov.
10-Wheel Passenger Locomotive: Delaware, Lackawanna & Western Railroad.* (25) Nov.
Vauclain 4-Cylinder Balanced Compound Atlantic Type Locomotive: Chicago, Rock Island & Pacific Railway.* (25) Nov.
Railway Rates; an Experiment in Rate-Making on an Interurban Railway. Wm. D. Marks, M. Am. Inst. E. E. (13) Nov. 2.
Protecting Railway Water Tanks from Freezing.* (Com. Rept. to the Assoc. of Ry. Supts. of Bridges and Bldgs.) (13) Nov. 2.
Proposed Concrete Floors for Railway Bridges and Tracks.* J. W. Schaub, M. Am. Soc C. E. (13) Nov. 2.
The Installation of Electric Traction on the Long Island R. R.* (13) Nov. 2.
Electrification of the Long Island Railroad.* S. D. V. Burr. (20) Nov. 2.
The Electrification of the Long Island Railroad.* (15) Nov. 3.
Concrete Floors without Ballast for Bridges and Roadway.* (15) Nov. 3.
Traction Electrique par Courant Alternatif Monophasé Transformé sur la Locomotive en Courant Continu.* M. Auvert. (38) Oct.
Explosion d'une Chaudière de Locomotive à la Gare Saint-Lazare (Paris).* (33) Oct. 14.

*Illustrated.

Railroad, Street.

Track and Track Tools of the Philadelphia Rapid Transit Co.* (72) Oct.
The Works of J. G. Brill Co., Philadelphia.* (72) Oct.
The New York Rapid Transit Railway.* (12) Serial beginning Oct. 13.
Hastings Electric Tramways.* (73) Oct. 13; (26) Oct. 13.
The Power Plant of the Boston & Worcester Street Railway.* Howard S. Knowlton. (14) Oct. 14.
The Missouri River Power House of the Metropolitan Street Railway Company, Kansas City, Missouri.* F. G. Cudworth, Assoc. M. Am. Soc. C. E. (13) Oct. 19.
Notes on Power Station Design. Fred N. Bushnell. (Extracts from Paper read before the Amer. St. Ry. Assoc.) (14) Oct. 21.
Some Interesting Track Construction with Tee and Girder Rails in Battle Creek and Kalamazoo.* (17) Oct. 28.
Die Einführung des Elektrischen Betriebes bei den Vereinigten Londoner Stadtbahnen.* K. Meyer. (48) Oct. 7.

Sanitary.

Drain Tile Laying. Gilmer Siler. (76) Serial beginning Oct.
Improving the Hot Water Supply of the Hotel Shoreham, Washington, D. C.* (70) Oct.
Construction of a Submerged Outfall Sewer.* (14) Oct. 14.
Heating System of the Squadron C Armory, Brooklyn, N. Y.* J. Byers Holbrook. (14) Oct. 14.
Septic Tanks and Double Contact Beds at Burnley, England. (13) Oct. 26.
Cost of the Chicago Drainage Canal. (13) Oct. 26.
Breakage in Sewer Pipes. (14) Oct. 28.
Sewage Purification at the Eastern Indiana Hospital for the Insane. (14) Oct. 28.
Die Lüftungsanlagen beim Baue der Grossen Alpentunnels.* Karl Brabbée. (53) Oct. 6.

Structural.

The Manufacture of Concrete Blocks and Their Use in Building Construction.* Wm. M. Torrance. (13) Oct. 12.
The Elastic Properties of Steel at High Temperatures.* Bertram Hopkinson, M. Inst. C. E., and F. Rogers. (62) Oct. 12.
The Manufacture and Properties of Hollow Concrete Blocks. (14) Oct. 14.
The New Philadelphia Building Regulations for Concrete Blocks. (13) Oct. 19.
Laying Concrete under Water. (14) Oct. 21.
Gallery Construction, Christ Church Memorial Building, New York.* (14) Oct. 21.
Steel Sheet Piling for a Boiler Room Excavation.* (14) Oct. 21.
Coaling Tower Foundations of the Union Electric Light & Power Co., St. Louis.* (14) Oct. 21.
Construction Details of a Modern Gas-Holder.* (13) Oct. 26.
The Manufacture of Concrete Blocks and Their Use in Building Construction. (13) Serial beginning Oct. 26.
Structural Features of the New Buildings at the New Orleans Naval Station.* L. F. Bellinger. (14) Oct. 28.
Reconstruction of the Mercantile Building, New York City.* (14) Oct. 28.
Building Regulations of Concrete Blocks. (60) Nov.
Frostproben mit Kalksandsteinen. E. Schleier. (80) Sept. 28.
Das Neue Rathaus in Leipzig.* (51) Serial beginning Sept. 30.
Silobau aus Eisenbeton für die Zellstoffabrik Waldhof bei Mannheim.* S. Sor. (78) Oct.
Spannungen in Schornsteinen mit Kreisringquerschnitt. R. Saliger. (78) Serial beginning Oct.
Die Berechnung der Eisenbetonsäulen und die Neuesten Versuche.* Mörsch. (51) Oct. 4.
Untersuchungen über die Bildsamkeit der Tone.* B. Zschokke. (80) Oct. 12.
Verfahren zum Nachweise Schadlicher Mengen von Gips in Portlandzement. (80) Oct. 14.
Die Verstärkung der Fundamente der Alexander-Kirche in Zweibrücken i. d. Pfalz.* Carl Doflein. (51) Oct. 25.

Water Supply.

Tests of Large Meters and Fire-Service Devices. William F. Sullivan. (28) Sept.
Fire-Service Meters. E. V. French. (28) Sept.
Report of the Committee on Meter Rates. (28) Sept.
The Sanitary Protection of Water Supplies. Kenneth Allen. (3) Oct.
Water Softening: Chemical Compounds found in Water; Proper Amounts of Lime and Soda to be Added to Water for Softening. Edwin Higgins, Jr. (45) Oct.
The Mechanical Filters at Youngstown.* (14) Oct. 7.

*Illustrated.

Water Supply—(Continued).

Water Power Plants on the Apple River, Wisconsin.* (13) Oct. 12.
The New Intake of the Erie Water-Works.* (14) Oct. 14.
The Riverdale Plant of the Apple River Power Co.* (14) Oct. 14.
Irrigation Engineering. Sir Hanbury Brown. (12) Serial beginning Oct. 20.
The Baden Reservoir of the St. Louis Water-Works.* (14) Oct. 21.
A Novel Steel Tower and Concrete Platform for a Wood Stave Water Tank.* Charles Worthington, M. Am. Soc. C. E. (13) Oct. 26.
The Turbine Pumping Plant of the Buffalo Water Works. (14) Oct. 28.
Development of the Necaxa, Mexico, Water Power.* (27) Oct. 28.
Protection of Water Tanks from Action of Frost.* (From a Com. Rept. to the Assoc. of Ry. Supts. of Bridges and Buildings.) (18) Oct. 28.
The Discharge of Water Through Street Taps and House Service Pipes. Wm. Paul Gerhard. (10) Nov.
Fire Department Water Supply. Charles Arthur Hague. (Paper read before the League of Amer. Municipalities.) (60) Nov.
Formules Nouvelles Générales pour le Calcul des Turbines Hydrâuliques. V. Albitsky. (Tr. by A. I. Golmann.) (37) Oct.
Bau einer Enteisenungsanlage in Richmond, Va. W. Kiersted. (78) Oct.
Theorie und Berechnung der Vollturbinen und Kreiselpumpen.* H. Lorenz. (48) Oct. 14.

Waterways.

The Present Status of the Panama Canal. Fullerton L. Waldo. (14) Oct. 7.
A Lighthouse of Reinforced Concrete.* (19) Oct. 14.
New Graving Dock at Southampton.* (11) Oct. 20; (12) Oct. 20.
Dredging and Dredging Appliances.* Brysson Cunningham. (10) Nov.
The First Year's Preparatory Work on the Panama Canal. John F. Wallace. (9) Nov.
La Défense des Cotes contre l'Erosion: Travaux de Bridlington (Angleterre).* (33) Sept. 30.
Outillage de la Nouvelle Entrée du Port de Saint-Nazaire.* Léon Griveaud. (35) Serial beginning Oct.
Grille pour l'Enlèvement Automatique des Matières Charriées par les Eaux.* (33) Oct. 14.
Portes Flottantes des Nouvelles Formes de Radoub du Port de Kiel.* (33) Oct. 14.
Wiederherstellungsarbeiten und Neugründungen unter Wasser mit Hilfe von Zement-Einpressung.* (51) Oct. 7.
Uber die Ausgestaltung des Hafens von Triest nach dem Projekte 1903.* Nándor Nádory. (53) Serial beginning Oct. 13.

*Illustrated.

AMERICAN SOCIETY OF CIVIL ENGINEERS.
INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

December 6th, 1905.—The meeting was called to order at 8.35 P. M.; President C. C. Schneider in the chair; Chas. Warren Hunt, Secretary; and present, also, 128 members and 22 guests.

The minutes of the meetings of November 1st and 15th, 1905, were approved as printed in the *Proceedings* for November, 1905.

A paper by Naoji Shiraishi, M. Am. Soc. C. E., entitled "A New Graving Dock at Nagasaki, Japan," was presented by the Secretary, who also read a communication on the subject from E. P. Goodrich, M. Am. Soc. C. E. The paper was discussed orally by Messrs. C. M. Jacobs and R. C. Hollyday.

The Secretary read the following letter from Thomas Fitch Rowland, Hon. M. Am. Soc. C. E.:

"329 Madison Avenue,
"New York City,
"Nov. 14th, 1905.

"Mr. Charles Warren Hunt, C. E.,
"Secy., The American Society of Civil Engrs.,
"No. 220 West 57th Street,
"New York City, N. Y.

"Dear Mr. Hunt:—

"Responding to your communication of the 1st instant, and confirming my statement made to you on the occasion of our interview at my residence on Monday, the 6th instant, I enclose check, drawn to the order of The American Society of Civil Engineers, for Five Thousand Dollars ($5,000) which I present as a donation towards assisting in the payment for enlarging and improving the ground and Society House, which has now been about accomplished.

"When by the vote of the members of The Am. Soc. of C. E., they declined to occupy, with other Technical Associations, a common 'Home' or general 'Society House,' to be furnished by Mr. Andrew Carnegie, but somewhat trammeled with conditions, the acceptance of which would probably necessitate the sale of our West 57th Street premises, and, in a measure, cause us to lose something of our identity, I wrote and voted in earnest protest of the scheme.

"For several reasons I was much opposed to the Society becoming identified therewith, believing it would result in the loss of much of our acknowledged prestige, and in the belittlement of our organization.

"The Society House which we then and now possess and occupy, seemed to me to be a better location for us, and I decided when the vote was known, that if, in the future, it became desirable to enlarge the area of the ground and the accommodations of the building, I would be pleased to do something in the way of assisting in the payment therefor, and so expressed myself to one or two of the members of the Society, as I remember it.

"Therefore, I send this check, *not as a loan*, but as a gift, whereby I desire to do my part in canceling the indebtedness which has been incurred by reason of these improvements, and I desire no consideration or acknowledgment therefor.

"The fact that for about thirty-nine years I have been a member of this Society, and in the enjoyment of all of its privileges, I consider is compensation enough for me, and I beg the Society will accept this sum which I herewith present as a gift, and use it in such way and in such interest as the Board of Directors may determine, to be most advantageous to the Society.

"With my best regards and kind respects for the directorship and for yourself, I am, Sir! Dear Mr. Hunt,

"Faithfully yours,
"Thomas Fitch Rowland."

It was moved by Emil Kuichling, M. Am. Soc. C. E., seconded by Chas. S. Gowen, M. Am. Soc. C. E., and carried unanimously, that the thanks of this Society be tendered to Thomas Fitch Rowland, Hon. M. Am. Soc. C. E., for the munificent donation of $5 000 which he has just made to this Society at a time when it is particularly desirable; and that the President of the Society be requested to convey such thanks to Mr. Rowland in proper official form.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

Hermann Alber, Birmingham, Ala.
Archibald Stuart Baldwin, Chicago, Ill.
Charles Lincoln Carpenter, Matachin, Canal Zone, Panama.
William Billings Clapp, Los Angeles, Cal.
Theodore Boyden Ford, Bridgeport, Conn.
John Debo Galloway, San Francisco, Cal.
George Aiken Gilfillan, Pittsburg, Pa.
Albert William Newton, St. Louis, Mo.
Frank Lee Nicholson, Norfolk, Va.
Oren Elisha Parks, Westfield, Mass.
Frank Charles Warner, Delaware City, Del.
Frederic James Wood, Foxboro, Mass.

As Associate Members.

Raymond Edmond Adams, Washington, D. C.
Elliot Ritchie Barclay Allardice, Clinton, Mass.
Eugene Yorke Allen, South Orange, N. J.
Walter Esmond Barnes, Boston, Mass.
Con Morrison Buck, Topeka, Kans.
John Edward Grady, Chicago, Ill.
John Lathrop Gray, Bayonne, N. J.
John Lewis Hildreth, Jr., Brooklyn, N. Y.
Chester James Hogue, Boston, Mass.
William Meadowcroft, Iloilo, Panay, Philippine Islands.
Ludlow Lawrence Melius, Glenmont, N. Y.
Oscar Melvern Severson, Buffalo, N. Y.
William Warburton Knox Sparrow, Queenstown, Cape Colony, South Africa.
Charles Wood Sutton, Lima, Peru.
Frank Westervelt Tooker, New York City.
Owen Adelbert Wait, Duluth, Minn.
Robert Alexander Widdicombe, Chicago, Ill.

As Associate.

Alfred Gaunt Patton, Philadelphia, Pa.

The Secretary announced the transfer of the following candidates, by the Board of Direction, on December 5th, 1905:

From Associate Member to Member.

George Morgan Bacon, Salt Lake City, Utah.
Werner Boecklin, West New Brighton, N. Y.
Frank Dodge Leffingwell, Montclair, N. J.
Edgar Walter McCormack, Mayari, Cuba.
Frank Edward Winsor, Boston, Mass.

The election of the following candidates, by the Board of Direction:

As Juniors.

On June 6th, 1905:

Leslie Monroe Fry, Bemidji, Minn.

On October 3d, 1905:

Charles Russell Turner, Guantanamo, Cuba.

On December 6th, 1905:

William Howard Alderson, San Francisco, Cal.
Arthur Whittemore Bacon, Fort Edward, N. Y.
Joseph Spencer Crane, Newark, N. J.
James Templeton Libbey, Corry, Pa.
Edwin Hopkins Seaman, New York City.
Philip Hichborn Spear, Elizabeth, N. J.

The Secretary announced the following deaths:

Justin Burns, elected Associate Member, April 6th, 1898; died November 14th, 1905.

Louis Ralph Lavalle, elected Associate Member, February 1st, 1905; died November 15th, 1905.

Thomas John Long, elected Junior, November 3d, 1875; Member, January 7th, 1880; died November 20th, 1905.

Gabriel Leverich, elected Member, July 6th, 1870; Secretary for the years 1872-1877 (inclusive); died November 28th, 1905.

Thomas Cooper Coleman, elected Fellow, May 28th, 1872; date of death unknown.

George Draper Stratton, elected Associate Member, January 8th, 1902; died November 21st, 1905.

Adjourned.

December 20th, 1905.—The meeting was called to order at 8.40 P. M.; Allen Hazen, M. Am. Soc. C. E., in the chair; Chas. Warren Hunt, Secretary; and present, also, 93 members and 22 guests.

A paper, by H. R. Stanford, M. Am. Soc. C. E., entitled "The Inspection of Treatment for the Protection of Timber by the Injection of Creosote Oil," was presented by the Secretary, who also read communications on the subject from Messrs. James C. Haugh, J. L. Campbell, Theodore Belzner, Cliff S. Walker, and E. H. Bowser.

The Secretary announced the death of WILLIAM MARSHALL REES, elected Member, October 4th, 1905; died December 4th, 1905.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

December 5th, 1905.—President Schneider in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Bissell, Bowman, Craven, Ellis, Gowen, Kuichling, Landreth, N. P. Lewis, Osgood, and Webster.

The following resolution was adopted:

"Resolved, That it is the sense of the Board of Direction that papers offered to the Society for publication, whether they are to be presented before a local organization or not, shall be first accepted by the Publication Committee and published in the *Proceedings* of the Society."

The following Committee was appointed to take charge of the arrangements for the Annual Meeting:

Messrs. Joseph Strachan, E. McL. Long, and Chas. Warren Hunt.

A letter from Thomas Fitch Rowland, Hon. M. Am. Soc. C. E., transmitting a gift of $5 000 to the Society was presented.*

The President and Secretary were authorized to convey to Mr. Rowland the thanks of the Society through the Board of Direction for this munificent gift.

Applications were considered, and other routine business transacted.

Five Associate Members were transferred to the grade of Member, and six candidates for Junior were elected.

Adjourned.

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* See page 530.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, January 3d, 1906.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, entitled "The Position of the Constructing Engineer, and his Duties in Relation to Inspection and the Enforcement of Contracts," by Albert J. Himes, M. Am. Soc. C. E., will be presented for discussion.

This paper was printed in *Proceedings* for November, 1905.

Wednesday, February 7th, 1906.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, entitled "Test of a Three-Stage, Direct-Connected Centrifugal Pumping Unit," by Philip E. Harroun, M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings*.

Wednesday, February 21st, 1906.—8.30 P. M.—At this meeting a paper, entitled "The Economical Design of Reinforced Concrete Floor Systems, for Fire-Resisting Structures," by John S. Sewell, M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings*.

ANNUAL MEETING.

The Fifty-third Annual Meeting will be held at the Society House, on Wednesday and Thursday, January 17th and 18th, 1906. The Business Meeting will be called to order at 10 o'clock on Wednesday morning. The Annual Reports will be presented, officers for the ensuing year elected, members of the Nominating Committee appointed and a proposed Amendment to the Constitution discussed. A report is also expected from the Special Committee on Rail Sections.

On Thursday evening, January 18th, 1906, a paper, entitled "The Changes in the New Croton Dam," by Charles S. Gowen, M. Am. Soc. C. E., will be presented and illustrated with lantern slides. This paper is printed in this number of *Proceedings*.

Arrangements for the excursions and entertainments have been placed in the hands of the following committee:

JOSEPH STRACHAN, *Chairman;*
EUGENE MCLEAN LONG, CHAS. WARREN HUNT.

NOMINATING COMMITTEE.

The Constitution provides that, at the Annual Meeting of each year, seven Corporate Members, not officers of the Society, one from each of the geographical districts into which the Society is divided for this purpose, shall be appointed by the meeting, to serve two years.

The usual blank request for suggestions as to representatives of each district, for presentation to the meeting, has been mailed to Corporate Members.

PROPOSED AMENDMENT TO THE CONSTITUTION.

The following proposed amendment to the Constitution has been received by the Secretary, and has been sent to all Corporate Members of the Society. In accordance with the provisions of Section 2 of Article IX of the Constitution, it will be considered at the Annual Meeting, January 17th, 1905:

"Amend Article II, Section 2, as follows: insert after the word 'Civil' in the first line 'Engineer who shall have reached a position of recognized standing in the profession, in its several branches including.' Also strike out all of the second line beginning with the word 'Electrical' and insert 'and Electrical Engineering or in Architecture or Marine Architecture.' Also strike out all after the word 'age' in the fourth line.

"The section will then read:

"2. A Member shall be a Civil Engineer who shall have reached a position of recognized standing in the profession, in its several branches including, Military, Naval, Mining, Mechanical and Electrical Engineering or in Architecture or Marine Architecture. He shall be at the time of admission to membership not less than thirty years of age."

The foregoing amendment is proposed by the following Corporate Members:

JAS. OWEN,
RALPH H. CHAMBERS,
PHILIP W. HENRY,
WALTER H. SEARS,
S. WHINERY,
A. P. BOLLER,
FOSTER CROWELL.

PRIVILEGES OF ENGINEERING SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

Members of the American Society of Civil Engineers will be welcomed by the following Engineering Societies, both to the use of their Reading Rooms and at all meetings:

North of England Institute of Mining and Mechanical Engineers, Newcastle-upon-Tyne, England.

Society of Engineers, 17 Victoria Street, Westminster, S. W., England.

American Institute of Mining Engineers, 99 John Street, New York City.

Boston Society of Civil Engineers, 715 Tremont Temple, Boston, Mass.

Civil Engineers' Club of Cleveland, 689 The Arcade, Cleveland, Ohio.

Engineers' Club of St. Louis, 3817 Olive Street, St. Louis, Mo.

Engineers' Club of Philadelphia, 1122 Girard Street, Philadelphia, Pa.

Engineers' Society of Western Pennsylvania, 410 Penn Avenue, Pittsburg, Pa.

Western Society of Engineers, 1737 Monadnock Block, Chicago, Ill.

Louisiana Engineering Society, 604 Tulane-Newcomb Building, New Orleans, La.

Engineers' Club of Central Pennsylvania, Corner, Second and Walnut Streets, Harrisburg, Pa.

Engineers' and Architects' Club of Louisville, Ky., 303 Norton Building, Fourth and Jefferson Streets, Louisville, Ky.

Teknisk Forening, Vestre Boulevard 18–1, Copenhagen, Denmark.

Société des Ingénieurs Civils de France, 19 Rue Blanche, Paris, France.

Svenska Teknologförenigen, Brunkebergstorg 18, Stockholm, Sweden.

Institute of Marine Engineers, 58 Romford Road, Stratford, London, E., England.

Midland Institute of Mining, Civil and Mechanical Engineers, Sheffield, England.

Sachsischer Ingenieur- und Architekten- Verein, Dresden, Germany.

Associação dos Engenheiros Civis Portuguezes, Lisbon, Portugal.

Pacific Northwest Society of Engineers, 617–618 Pioneer Building, Seattle, Wash.

Institution of Naval Architects, 5 Adelphi Terrace, London, W. C., England.

Memphis Engineering Society, Memphis, Tenn.

Oesterreichischer Ingenieur- und Architekten-Verein, Eschenbachgasse 9, Vienna, Austria.

The Junior Institution of Engineers, 39 Victoria Street, Westminster, S. W., London, England.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

ACCESSIONS TO THE LIBRARY.

From November 7th to December 9th, 1905.

DONATIONS.*

STRUCTURAL MECHANICS.

Comprising the Strength and Resistance of Materials and Elements of Structural Design, with Examples and Problems. By Charles E. Greene. Second Edition. New York, John Wiley & Sons, 1905. $2.50 net.

The preface states that this work is intended to be serviceable after classroom work is concluded, and reference is facilitated by a compact arrangement of the subject matter. The attempt has been made to deal with practicable cases, and the examples, for the most part, are shaped with that end in view. It is stated that the treatment of the subject of internal stress is largely graphical. All the constructions are simple, and the results, besides being useful in themselves, shed much light on various problems. The notation is practically uniform throughout the book, and is that used by several standard authors. Forces and motions are expressed by capital letters, and unit loads and stresses by small letters. The co-ordinate, x, is measured along the length of a piece, the co-ordinate, y, in the direction of variation of stress in a section, and z is the line of no variation of stress, that is, the line parallel to the moment axis. There is an index of four pages.

THE PANAMA CANAL SYSTEM AND PROJECTS.

By Lindon W. Bates. Cloth, 11 x 9 in., illus., 178 pp. Published by the author, 1905.

In this work the author gives his own projects for the solution of the Panama Canal problem. The contents are: General Survey; Factors and Conditions; Constants; Chagres Control; Lake Chagres and Panama; Terminal Harbors; Main Applications of System; Miscellaneous Disposition; Sanitation; Navigation Conditions; Finances; and Conclusion. There is an index of eight pages. The second part of the book contains fifteen plates, relief maps, diagrams and plans with a descriptive paragraph following each one referring to related matter in the text. This part also contains an index of three pages.

GAS, GASOLINE AND OIL ENGINES.

Including Producer-Gas Plants. By Gardner D. Hiscox. Fifteenth Edition. Cloth, 9 x 6 in., illus., 442 pp. New York, The Norman W. Henley Publishing Co., 132 Nassau Street, 1906. $2.50.

The preface states that the author has rewritten, revised and added to the contents of the last edition of this work such materials coming to his knowledge as will better represent the latest standards of construction and operation of the explosive motor; to which is added an illustrated chapter on the production of the new fuel gases and their uses. He aims to show the progress made in adapting the use of crude petroleum as fuel for explosive power, together with the rapid development of the producer-gas industry, giving a new economy in the production of power, and the use of the hitherto neglected gaseous elements of blast-furnace and coke manufacture, adding new sources of power production at a nominal cost. The rules and regulations formulated by the insurance interest for the safe installation of gasoline-motors and producer-gas plants, are given a place in this edition as a matter of reference. The list of patents has been extended into the past year, and a list of the manufacturers of explosive motors of all types, in the United States and Canada, has been added. The publishers have had the entire work reset from new type and have added several hundred new illustrations. There is an index of more than five pages.

ARTIFICIAL STONE, ETC.

The Illustrated Carpenter and Builder Series of Technical Manuals, No. 13. Edited by John Black. Cloth, 7 x 5 in., illus., 92 pp. New York, Industrial Publication Co. 50 cents.

It is stated in the preface that this work includes some processes in stonework which, although they do not incorporate the manufacture of stone yet are dependent on the manipulation of stone and if not ground up and manu-

*Unless otherwise specified, books in this list have been donated by the publishers.

factured are, strictly speaking, artificial stone. The literary portion has been curtailed to afford a fuller description of many special processes and manufactures, each claiming some peculiar point of excellence. They are simply described and the reader may make his own selection. The contents are: Early Manufacture and use of Concrete and Artificial Stone; Mosaic, its Construction, Manufacture and Use as a Decorative Material; Systems of Paving —Artificial Stone and Paving Material; Testing Building Stone;—Artificial Sandstones—Sills, Bricks and Blocks; Hydraulic Machinery for Moulding Artificial Stone; Artificial Stone Specially Adapted for Paving and Other Purposes; Hollow Stone Building Blocks; Invention of Artificial Stone—Scagliola and Enamelled Slate—Proportions for Mixing, etc.—General Treatment; Continental and American Methods of Making Artificial Stone; Terra-Cotta, its History, Use in Building, Adaptation to General Use, Manufacture, and Cost. There is no index.

Gifts have also been received from the following:

Adams, Alice D. 181 bound vol., 8 vol., 632 pam., 7 specif., 6 maps.
Adams, E. D. 2 bound vol.
Atlantic Coast Line R. R. Co. 1 pam.
Bensel, J. A. 1 bound vol., 1 pam.
Briggs, J. A. 1 vol.
British Fire Prevention Committee. 2 pam.
Canada-Interior Dept. 1 vol.
Chicago-South Park Comm. 31 pam.
Chicago, Milwaukee & St. Paul Ry. Co. 1 pam.
Cincinnati & Muskingum Valley R. R. Co. 6 pam.
Cincinnati, New Orleans & Texas Pacific Ry. Co. 1 pam.
Cleveland, Akron & Columbus Ry. Co. 15 pam.
Cox, I. M. 1 bound vol.
De Varona, I. M. 12 bound vol., 14 vol., 6 pam.
Detroit-Board of Water Commrs. 1 pam.
Eng. Standards Committee. 1 vol.
Engrs. Soc. of Western New York. 7 pam.
Fink, Henry. 1 bound vol.
France-Ministère des Travaux Publics. 2 vol.
Georgia Southern & Florida Ry. Co. 12 pam.
Great Britain-Patent Office. 9 pam., 5 vol.
Great Northern Ry. Co. 30 pam.
Great Western Ry. Co. 51 pam.
Hall, W. H. 2 pam.
Inst. of Civ. Engrs. 1 bound vol.
Inst. of Min. and Metallurgy. 1 bound vol.
Inst. of Naval Archts. 1 bound vol.
Jäh & Schunke. 1 pam.
Lawrence, Mass.-City Engr. 3 pam.
Lawrence, Mass.-Water Board. 1 pam.
Madras, India-Public Works Dept. 1 pam.
Mass.-State Board of Health. 1 bound vol.
Master Car Builders' Assoc. 1 bound vol.
Mexican Ry. Co., Ltd. 2 pam.
Mexican Southern Ry. Co., Ltd. 3 pam.
Miller, R. P. 1 bound vol., 1 pam.
National Elec. Light Assoc. 2 bound vol.
New York City-Board of Water Supply. 1 pam.
New York City-Commr. of Accounts. 5 bound vol., 4 vol., 3 pam.
New York City-Dept. of Health. 12 bound vol.
New York-State Museum. 21 bound vol.
New York Board of Fire Underwriters. 3 pam.
New York City Record. 3 bound vol.
Newcomb, H. T. 1 pam.
Norfolk & Southern R. R. Co. 1 pam.
Norfolk & Western Ry. Co. 2 pam.
North Eastern Ry. Co. 7 pam.
North Shore Ry. Co. 2 pam.
Northeast Coast Inst. of Engrs. and Shipbuilders. 1 bound vol.
Northern Pacific Ry. Co. 1 pam.
Ohio-Bureau of Inspection and Supervision of Public Offices. 1 vol.
Old Colony R. R. Co. 5 pam.
Osaka, Japan-Public Library. 1 pam.
Pacific Coast Co. 6 pam.
Panama R. R. Co. 3 pam.
Pennsylvania Co. 3 pam.
Philadelphia & Erie R. R. Co. 5 pam.
Pittsburgh, Cincinnati, Chicago & St. Louis Ry. Co. 3 pam.
Platt, T. C. 11 pam.
Poor's Manual Co. 1 bound vol., 1 vol.
Purdue Univ. 4 pam.
Quebec & Lake St. John Ry. 5 pam.
Quebec Central Ry. Co. 1 pam.
Quinette de Rochemont, *Baron*. E. T. M. 2 pam.
Reading, Pa.-Board of Water Commrs. 1 bound vol.
Richmond, Fredericksburg & Potomac Ry. Co. 2 pam.
St. John, N. B.-Water and Sewerage Dept. 1 pam.
St. Louis, Vandalia & Terre Haute R. R. Co. 3 pam.
Scientific Pub. Co. 1 bound vol.
Shepherd, E. S. 2 pam.
Smithsonian Inst. 20 bound vol., 74 vol., 35 pam.
South Austrialia-Commr. of Rys. 2 pam.
Southern Indiana Ry. Co. 1 pam.
Stoddart, F. W. 1 bound vol., 1 pam.
Tait, W. A. 1 bound vol.
Union Pacific R. R. Co. 1 pam.
U. S. Bureau of Insular Affairs. 1 pam.
U. S. Bureau of Labor. 1 vol.
U. S. Bureau of Manufactures. 1 vol.
U. S. Coast and Geodetic Survey. 1 vol., 147 maps.
U. S. Div. of Foreign Markets. 2 pam.
U. S. Forest Service. 2 pam.
U. S. Geol. Survey. 2 bound vol., 38 vols.
U. S. Lake Survey Office. 1 pam., 3 maps.
U. S. National Museum. 18 bound vol., 12 vol., 1 pam.
U. S. Naval War Record Office and Library. 4 vol.
U. S. Office of Exper. Stations. 1 pam.
Univ. of Ill. 5 vol.
Unknown. 1 pam.
West Virginia-State Geologist. 1 map.
Woolson, I. H. 1 bound vol., 5 pam.
Wyoming-State Engr. 1 bound vol., 1 pam.

BY PURCHASE.

Le Ciment, 1902–04. Paris, N. de Tédesco, 1902–04.

Steam Pipes, Their Design and Construction; a Treatise of the Principles of Steam Conveyance and Means and Materials Employed in Practice, to secure Economy, Efficiency and Safety. By Wm. H. Booth, M. Am. Soc. C. E. New York, The Norman W. Henley Publishing Company, 1905.

Synchronous and Other Multiple Telegraphs; Some Methods of Obtaining Independent Telegraph Circuits on a Single Wire both with and without Synchronism. By Albert Cushing Crehore. New York, McGraw Publishing Company, 1905.

Mechanical Engineer's Pocket-Book. By William Kent. Seventh Edition, Revised and Enlarged. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1905.

Crystallization of Iron and Steel; an Introduction to the Study of Metallography. By J. W. Mellor. London, Longmans, Green & Co., 1905.

Die Automatische Regulierung der Turbinen. Von Walther Bauersfeld. Berlin, Julius Springer, 1905.

Engineering Chemistry; a Manual of Quantitative Chemical Analysis for the use of Students, Chemists and Engineers. By Thomas B. Stillman. Easton, Pa., Chemical Publishing Co., 1905.

Practical Shipbuilding; a Treatise on the Structural Design and Building of Modern Steel Vessels, Vols. 1–2. By A. Campbell Holms. New York, Longmans, Green & Co., 1904.

Report to the Royal Commission on London Traffic by the Advisory Board of Engineers, Vol. II, III, and VIII. London, Wyman and Sons, Limited, 1905.

Structural and Field Geology. By James Geikie. New York, D. Van Nostrand Company, 1905.

Concrete; Its Use in Building and the Construction of Concrete Walls, Floors, Roofs, etc. By Thomas Potter. London, B. T. Batsford, prof. date, 1894.

Elements of the Mathematical Theory of Electricity and Magnetism. By J. J. Thomson. Third Edition. Cambridge, The University Press, 1904.

Report of Test of Metals and Other Materials for Industrial Purposes; made with the United States Testing Machine at Watertown Arsenal, Massachusetts, during the fiscal year ended June 30, 1894–1895. Washington, Government Printing Office, 1895–96.

The Timbers of Commerce and their Identification. By Herbert Stone. London, William Rider and Son, Limited, 1904.

Cyanide Processes. By E. B. Wilson. Third Edition, Rewritten. New York, John Wiley & Sons; London, Chapman & Hall, Limited. 1902.

A System of Mineralogy; Descriptive Mineralogy, comprising the most Recent Discoveries. By James Dwight Dana. Fifth Edition, Rewritten and Enlarged. New York, John Wiley & Sons, 1880.

Practical Gold-Mining; a Comprehensive Treatise on the Origin and Occurrence of Gold-Bearing Gravels, Rocks and Ores and the Methods by which the Gold is Extracted. By C. G. Warnford Lock. London, E. & F. N. Spon, 1889.

Traité Théorique et Pratique de Métallurgie Generale, Tome Second. By L. Babu. Paris, Ch. Béranger, 1906.

SUMMARY OF ACCESSIONS.

November 7th to December 9th, 1905.

Donations (including 576 duplicates)	1 591
By purchase	24
Total	1 615

MEMBERSHIP.

ADDITIONS.

MEMBERS.

		Date of Membership.
AYRES, CLARENCE MORTON. Chf. Engr., Central Iron & Coal Co., Holt, Ala.	Assoc. M.	Oct. 2, 1901
	M.	Oct. 31, 1905
BOWMAN, CHARLES ABEL. 514 Dillaye Bldg., Syracuse, N. Y.		Nov. 1, 1905
BRAXTON, JAQUELIN MARSHALL. U. S. Asst. Engr., Key West, Fla.	Jun.	Jan. 5, 1897
	Assoc. M.	May 3, 1899
	M.	Oct. 31, 1905
CHRISTIAN, GEORGE LYON. Asst. Engr., Bureau of Sewers, Borough of the Bronx, East 177th St. and 3d Ave. (Res., East 238th St., Woodlawn), New York City.	Assoc. M.	Mar. 6, 1895
	M.	Oct. 3, 1905
COLPITTS, WALTER WILLIAM. Asst. Chf. Engr., Kans. City, Mex. & Orient Ry., 705 Bryant Bldg., Kansas City, Mo.		Nov. 1, 1905
FORD, THEODORE BOYDEN. 167 State St., Bridgeport, Conn.		Dec. 6, 1905
FRAZIER, JAMES WELCH. Cons. Engr. (Frazier, Fox & Spencer), 718 Rockefeller Bldg., Cleveland, Ohio.	Assoc. M.	May 6, 1903
	M.	Sept. 5, 1905
GILFILLAN, GEORGE AIKEN. 341 Fourth Ave., Pittsburg, Pa.		Dec. 6, 1905
HOWARD, CHARLES POPE. Care, Howard & Davis, Charleston, W. Va.	Assoc. M.	Jan. 3, 1894
	M.	Oct. 31, 1905
KELLER, CHARLES LINCOLN. First Asst. Engr., The Scherzer Rolling Lift Bridge Co., 1616 Monadnock Blk., Chicago, Ill.	Jun.	Oct. 4, 1898
	Assoc. M.	Mar. 6, 1901
	M.	Oct. 31, 1905
LUPFER, ALEXANDER MCCLURE. Chf. Engr., Spokane & Inland Ry. Co., 413 Mohawk Bldg., Spokane, Wash.		Nov. 1, 1905
MCKIBBEN, FRANK PAPE. Asst. Prof. of Civ. Eng., Mass. Inst. Tech., Boston, Mass.	Jun.	Jan. 3, 1895
	Assoc. M.	Mar. 6, 1901
	M.	Oct. 3, 1905
MATAMOROS, LUIS. P. O. Box 295, San José, Costa Rica.		Oct. 4, 1905
PUFFER, WILLIAM HASELTON. Guanajuato, Mexico		May 3, 1905
SHEAL, ROBERT ERWIN. 3 Republic Pl., Cleveland, Ohio.		Oct. 4, 1905
STEWART, ROBERT DEE. Chf. Engr., Laramie, Hahn's Peak & Pacific Ry., Laramie, Wyo.		Nov. 1, 1905
TANABE, SAKURO. Prof. of Civ. Eng., Kyoto Imperial Univ., Kyoto, Japan		Oct. 4, 1905
WHITTEMORE, WALTER FRANK. 1 Newark St., Hoboken, N. J.	Jun.	Mar. 6, 1889
	Assoc. M.	April 6, 1892
	M.	Oct. 31, 1905

MEMBERS (*Continued*).

		Date of Membership.
WINSOR, FRANK EDWARD. Div. Engr., Charles River Basin Comm., 367 Boylston St., Boston, Mass.	Assoc. M.	Nov. 4, 1903
	M.	Dec. 5, 1905

ASSOCIATE MEMBERS.

BOND, GEORGE WASHINGTON, JR. Station 1, Hoboken, N. J.	Nov. 1, 1905
BRAZER, GEORGE HERBERT. 122 East Cottage St., Dorchester, Mass.	Nov. 1, 1905
BROWN, SAMUEL COUGHLIN. Div. Engr., Erie R. R., Jersey City, N. J.	Nov. 1, 1905
BURKE, JOHN THOMAS. 317 East Jefferson St., Boise, Idaho	Nov. 1, 1905
COUCHOT, MAURICE CHARLES. Civ. and Mech. Engr., 222 Rialto Bldg., San Francisco, Cal.	Nov. 1, 1905
DALTON, JOHN JEROME. P. O. Box 91, Selma, Ala.	Dec. 7, 1904
DARROW, WILTON JOSEPH. 215 West 44th St., New York City.	Nov. 1, 1905
DAVIS, FREDERICK. Asst. Engr., Penn., N. Y. & L. I. R. R., 345 East 33d St., New York City.	Oct. 4, 1905
DUNN, HERBERT LUTHER. Civ. Engr. and Supt. of Constr., The Draper Co., Hopedale, Mass.	Nov. 1, 1905
ECKART, NELSON ANDREW. 3014 Clay St., San Francisco, Cal.	Nov. 1, 1905
FISHER, HOWELL TRACY. Asst. Engr., Penn., N. Y. & L. I. R. R. Co., 1 West 34th St., New York City.	Nov. 1, 1905
GILES, ARTHUR LEONARD. Hurdman's Bridge P. O., Ottawa, Ont., Canada	Oct. 4, 1905
HAGER, ALBERT BERTRAM. Asst. Engr., Designing Dept., Am. Bridge Co., 42 Broadway, New York City (Res., 74 Donaldson Ave., Rutherford, N. J.).	Nov. 1, 1905
HUNT, CHARLES ADAMS. 1500 Bedford Ave., Brooklyn, N. Y.	Oct. 4, 1905
JOHANNESSON, SIGVALD. Asst. Engr., Penn. R. R. Tunnels, North River Div., 1 West 34th St., New York City.	Nov. 1, 1905
KIRBY, ISAAC HENRY. Roslyn, Nassau Co., N. Y.	Nov. 1, 1905
MCDANIEL, ALLEN BOYER. Asst. Engr., Penn., N. Y., L. I. R. R., 345 East 33d St., New York City.	Nov. 1, 1905
MEEK, GORDON STAFFORD. Civ. Engr. for Pittsburg Conneaut Dock Co., Conneaut, Ohio	Oct. 4, 1905
NIXON, COURTLAND. Capt. and Quartermaster, U. S. A., Care, Post Office, Dodge, Ga.	Nov. 1, 1905
OLDER, CLIFFORD. Asst. Engr., Chic. & Alton Ry. Co., Slater, Mo.	Oct. 4, 1905

ASSOCIATE MEMBERS (*Continued*).

	Date of Membership.
SHAW, FRANK HAROLD. 519 Woolworth Bldg., Lancaster, Pa.	Oct. 4, 1905
SMITH, HARRADON STERLING. Cons. Engr. (Smith & Welles), 79 Coal Exchange, Wilkes-Barre, Pa.	Nov. 1, 1905
SMITH, JAMES. Care, P. & W. MacLellan, Ltd., Coatzacoalcos, Mexico.	Nov. 1, 1905
TAFT, JESSE RUSSELL. Asst. Engr., N. Y. C. & H. R. R. R., Office of Terminal Engr., Grand Central Station, New York City. (Jun.)	June 2, 1903
(Assoc. M.)	Sept. 6, 1905
TERRELL, WILLIFORD HARRY. Chf. Engr., Proximity Mfg. Co., Greensboro, N. C.	Nov. 1, 1905
TWIGGS, JOHN DAVID, JR. Asst. City Engr., Augusta, Ga.	Nov. 1, 1905
UPJOHN, HOBART BROWN. 1123 Broadway, New York City.	Oct. 4, 1905
WADDELL, FREDERICK CREELMAN. Wardwell Ave., West New Brighton, N. Y.	Oct. 4, 1905
WELLER, FRANCIS REPETTI. (Pressey & Weller, Civ. and Hydr. Engrs.), 1416 F St., N. W., Washington, D. C. (Jun.)	Feb. 5, 1901
(Assoc. M.)	Nov. 1, 1905
WELTON, BENJAMIN FRANKLIN. Examining Engr., Commrs. of Accounts, 280 Broadway, New York City. (Res., 1 Wiener Pl., Tompkinsville, N. Y.) (Jun.)	April 6, 1897
(Assoc. M.)	Nov. 1, 1905

ASSOCIATES.

HOLDEN, CHARLES ARTHUR. Assoc. Prof. in Civ. Eng., Thayer School of Civ. Eng., and Asst. Prof. in Mathematics, Dartmouth Coll., Hanover, N. H.	Nov. 1, 1905

JUNIORS.

BACON, ARTHUR WHITTEMORE. P. O. Box 500, Fort Edward, N. Y.	Dec. 5, 1905
CRISP, ERNEST JOHN. 406 West Ave., Elyria, Ohio.	Oct. 31, 1905
EWING, WILLIARD REA. Asst. Engr., U. S. Reclamation Service, Minidoka, Idaho.	Oct. 31, 1905
GARRIGUES, HENRY HAYDOCK. Asst. Supervisor, Pittsburgh Div., P. R. R., Wall, Pa.	Oct. 31, 1905
GILLEN, WALTER JOSEPH. Leveler, Aqueduct Comm., Croton Falls, N. Y.	Oct. 31, 1905
KRELLWITZ, DIEDRICH WILLIAM. 55 Mutual St., Toronto, Ont., Canada	Oct. 31, 1905
STEVENSON, THOMAS PATTON, JR. Paramaribo, Dutch Guiana	April 4, 1905
TURNER, CHARLES RUSSELL. U. S. Naval Station, Guantanamo, Cuba	Oct. 3, 1905
WHITSIT, LYLE ANTRIM. Springfield, Idaho.	Oct. 31, 1905

DEATHS.

BURNS, JUSTIN. Elected Associate Member, April 6th, 1898; died November 14th, 1905.

COLEMAN, THOMAS COOPER. Elected Fellow, May 28th, 1872; date of death unknown.

GREENE, DAVID MAXSON. Elected Member, May 20th, 1868; died November 9th, 1905.

LAVALLE, LOUIS RALPH. Elected Associate Member, February 1st, 1905; died November 15th, 1905.

LEVERICH, GABRIEL. Elected Member, July 6th, 1870; died November 28th, 1905.

LONG, THOMAS JOHN. Elected Junior, November 3d, 1875; Member, January 7th, 1880; died November 20th, 1905.

REES, WILLIAM MARSHALL. Elected Member, October 4th, 1905; died December 4th, 1905.

STRATTON, GEORGE DRAPER. Elected Associate Member, October 4th, 1899; died November 21st, 1905.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(November 5th to December 9th, 1905.)

NOTE.—*This list is published for the purpose of placing before the members of the Society, the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal,* Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings,* Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal,* Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal,* Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions,* Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly,* Columbia Univ., New York City, 50c.
(7) *Technology Quarterly,* Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator,* Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine,* New York City, 25c.
(10) *Cassier's Magazine,* New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News,* New York City, 15c.
(14) *The Engineering Record,* New York City, 12c.
(15) *Railroad Gazette,* New York City, 10c.
(16) *Engineering and Mining Journal,* New York City, 15c.
(17) *Street Railway Journal,* New York City. Issues for first Saturday of each month 20c., other issues 10c.
(18) *Railway and Engineering Review,* Chicago, Ill., 10c.
(19) *Scientific American Supplement,* New York City, 10c.
(20) *Iron Age,* New York City, 10c.
(21) *Railway Engineer,* London, England, 25c.
(22) *Iron and Coal Trades Review,* London, England, 25c.
(23) *Bulletin,* American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal,* New York City, 10c.
(25) *American Engineer,* New York City, 20c.
(26) *Electrical Review,* London, England.
(27) *Electrical World and Engineer,* New York City, 10c.
(28) *Journal,* New England Water-Works Assoc., Boston, $1.
(29) *Journal,* Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique,* Brussels, Belgium.
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(32) *Memoires et Compte Rendu des Travaux,* Soc. Ing. Civ. de France, Paris, France.
(33) *Le Genie Civil,* Paris, France.
(34) *Portefouille Economique des Machines,* Paris, France.
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(37) *Review de Mecanique,* Paris, France.
(38) *Revue Generale des Chemins de Fer et des Tramways,* Paris, France.
(39) *Railway Master Mechanic,* Chicago, Ill., 10c.
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(45) *Mines and Minerals,* Scranton, Pa., 20c.
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(60) *Municipal Engineering,* Indianapolis, Ind., 25c.
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(62) *American Manufacturer and Iron World,* 59 Ninth St., Pittsburg, Pa.
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The Velocity of Water Flowing Down a Steep Slope. Ernest Prescot Hill, M. Inst. C. E. (63) Vol. 161.
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Notes on Water Softening. W. M. Gardner and L. L. Lloyd. (Abstract of Paper in *Journal* Soc. Chem. Ind.) (16) Dec. 2.
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The Hydraulic Dredge *J. Israel Tarte.** A. W. Robinson. (5) Vol. 18, Pt. 1.
The Use of Electricity on the Lachine Canal.* L. A. Herdt. (5) Vol. 18, Pt. 1.
Electrical Equipment for Cornwall Canal.* F. H. Leonard, Jr. (5) Vol. 18, Pt. 1.

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Seaham Harbour New Works.* (12) Nov. 10.
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* Illustrated.

AMERICAN SOCIETY

OF

CIVIL ENGINEERS.

INSTITUTED NOVEMBER 5, 1852.

CONSTITUTION AND LIST OF MEMBERS.

FEBRUARY 10TH, 1905.

HOUSE OF THE SOCIETY, 220 WEST FIFTY-SEVENTH STREET,
NEW YORK.

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HOUSE OF THE SOCIETY,

220 West 57th Street.

Cable Address:
"Ceas, New York."

Telephone:
533 Columbus.

CALENDAR.

1905-06.

DATES OF MEETINGS IN BOLD-FACED TYPE.

FEBRUARY						
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NOTE.—Regular meetings are called to order at 8.30 P. M.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

The Annual Convention will be held at Cleveland, Ohio, on June 20th, 21st, 22d and 23d, 1905.

CONSTITUTION.

ADOPTED MARCH 4TH, 1891.*

ARTICLE I.—NAME, LOCATION AND OBJECT.

1.—The name of this Association shall be the AMERICAN SOCIETY OF CIVIL ENGINEERS.

2.—The offices of the Society shall be located in the City of New York.

3.—Its objects shall be the advancement of engineering knowledge and practice and the maintenance of a high professional standard among its members.

4.—Among the means to be employed for this purpose shall be: meetings for the presentation and discussion of appropriate papers and for social and professional intercourse; the publication of such papers and discussions as may be deemed expedient; the maintenance of a library, the collection of maps, drawings and models, and the establishment of facilities for their use.

ARTICLE II.—MEMBERSHIP.

1.—The Corporate Members of this Society shall be designated as Members and Associate Members. There may also be connected with the Society, Honorary Members, Associates, Juniors and Fellows who shall be entitled to all the privileges of the Society, except the right to vote and to hold office therein; provided that Honorary Members elected from the Corporate Members of the Society shall retain their right to vote and to hold office.

2.—A Member shall be a Civil, Military, Naval, Mining, Mechanical, Electrical, or other professional Engineer, an Architect or a Marine Architect. He shall be at the time of admission to membership not less than thirty years of age, and shall have been in the active practice of his profession for ten years; he shall have had responsible charge of work for at least five years, and shall be qualified to design as well as to direct engineering works. Graduation from a school of engineering of recognized reputation shall be considered as equivalent to two years' active practice. The performance of the duties of a Professor of Engineering in a technical school of a high grade shall be taken as an equivalent to an equal number of years of actual practice.

* Amended October 3d, 1894; March 6th, 1895; October 6th, 1897; October 5th, 1898; October 3d, 1900; March 4th, 1903, and October 7th, 1903.

3.—An Associate Member shall be a professional Engineer or Architect not less than twenty-five years of age, who shall have been in the active practice of his profession for at least six years, and who shall have had responsible charge of work as principal or assistant for at least one year. Graduation from a school of engineering of recognized reputation shall be considered as equivalent to two years' active practice.

4.—Any person having the necessary qualifications prescribed in this article to entitle him to admission to the grades of Member or Associate Member, shall be eligible for such membership, though he may not be practicing his profession at the time of making his application.

5.—An Associate shall be a person who, by scientific acquirements or practical experience, has attained a position in his special pursuit qualifying him to co-operate with engineers in the advancement of professional knowledge and practice, but who is not a professional engineer.

6.—A Junior shall not be less than eighteen years of age, and his connection with the Society shall cease when he becomes thirty-two years of age, unless he be previously transferred to another grade. He shall have had active practice in some branch of engineering for at least two years, or he shall have graduated from a school of engineering of recognized standing. Persons who are in the Junior class at the time of the adoption of this Constitution shall not have their status changed by the provisions of this section.

7.—Honorary Members shall be chosen only from persons of acknowledged eminence in some branch of engineering or the sciences related thereto. There shall not be more than twenty at any one time.

8.—Fellows shall be contributors to the permanent funds of the Society, though they may not be eligible for admission as Corporate Members.

ARTICLE III.—Admissions and Expulsions.

1.—Honorary Members shall be proposed by at least ten members, and shall be elected only by a unanimous vote of the Board of Direction. A Past-President, or a member of the Board of Direction proposed for Honorary Membership, shall not be required to vote either for or against his own admission.

A person elected an Honorary Member shall be promptly notified thereof by letter. The election shall be cancelled if an acceptance is not received within six months after the mailing of such notice.

All members other than Honorary Members and Juniors shall be admitted to the Society only by vote of the Corporate Members, as hereinafter specified.

2.—An application for admission to the Society or for transfer from one grade to another shall embody a concise statement, with dates, of the candidate's professional training and experience; and shall be in a form and in such detail as may be prescribed by the Board of Direction. It shall be signed by the applicant, and shall contain a promise to conform to the requirements of membership, if elected. The applicant shall furnish the names of at least five Corporate Members to whom he is personally known. Each of these shall be requested by the Secretary to address a letter to the Board of Direction, on a form prescribed by said Board, stating the extent of the writer's personal knowledge of the applicant and of his professional work. If at least five of the Corporate Members named as references do not furnish the requisite endorse-

ment, the Secretary shall call upon the applicant for additional names, and not until written communications shall have been received from at least five Corporate Members shall the application be considered by the Board.

Applications of engineers not resident in North America, and who may be so situated as not to be personally known to five Corporate Members, may be recommended for ballot by five members of the Board of Direction, after having secured evidence sufficient, in their opinion, to show that the applicant is worthy of admission.

3.—At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all new applications received for admission or for transfer, which list shall be dated and shall contain a concise statement of the record of each applicant and the names of his references, with a request that members transmit to the Board any information in their possession which may affect the disposition of the applications. Not less than twenty days after the issue of such list, the Board of Direction shall consider these applications, together with any information in regard to the applicants that may have been received; may make further inquiries, if deemed expedient; shall classify the applicant with his consent, and on application for admission may direct a ballot.

The Board shall have the power to elect persons to the grade of Junior, and to transfer persons from any grade except that of Junior to a higher grade of membership, and shall notify the membership of its action.

4.—The ballots shall be letter-ballots, in a form to be prescribed by the Board of Direction. They shall be mailed to each Corporate Member whose address is known, and shall state the date on which the ballot is to be canvassed, which shall be not less than twenty days after the issue of the ballot. Twenty or more negative votes shall exclude from election. In case of exclusion, no notice thereof shall be entered on the minutes, but the candidate shall be notified.

A rejected applicant may renew his application for membership at any time after the expiration of one year from the date of the ballot rejecting his previous application.

5.—All elected candidates shall be duly notified and shall subscribe to the Constitution and Rules of the Society. Forms for these purposes shall be prescribed by the Board of Direction. If these provisions are not complied with within six months from the notification of election, such election shall be considered void, unless for special reason the time shall be extended by the Board of Direction.

Membership of any person shall date from the day of his election.

6.—Upon the written request of ten or more Corporate Members, that for cause therein set forth a person belonging to the Society be expelled, the Board of Direction shall consider the matter, and if there appears to be sufficient reason, shall advise the accused of the charges against him. He may, if he so desires, present a written defence which shall be considered at a meeting of the Board of Direction, of which he shall receive due notice. Not less than two months after such meeting, the Board of Direction shall finally consider the case, and if resignation has not been tendered, or a defence made which is satisfactory to the Board, it shall then notify the person that he will be expelled in one month, unless he elects to appeal from this decision. Appeals will be

submitted to the Corporate Members by letter-ballot in a form to be prescribed by the Board of Direction. The ballot shall be accompanied by a statement of the charges, and of the action of the Board thereon, with such information as it deems proper, and also the statement of the person making the appeal. The ballot shall be canvassed by the Board not less than twenty days after its issue. A majority of the ballots cast will be required to sustain the action of the Board. The Board will notify the person and the Corporate Members of the result of the ballot. In case no appeal be made, the Board of Direction will expel the person, and notify him and the Corporate Members of its action.

7.—A member of any grade in the Society may resign his membership by a written communication to the Secretary, who shall present the same to the Board of Direction; when, if all his dues have been paid, his resignation shall be accepted.

8.—All persons elected and duly qualified, whose address on the records of the Society is within fifty miles of the Post Office in the City of New York, shall be deemed Resident; and those whose address is beyond that limit shall be deemed Non-Resident.

The classification of each person for the fiscal year as Resident or Non-Resident, shall be determined by the Records of the Society as they may appear on January 1st of that year.

ARTICLE IV.—Dues.

1.—The entrance fees payable on admission to the Society shall be as follows: by Members, thirty dollars; Associate Members, twenty-five dollars; Associates, twenty dollars; Juniors, ten dollars.

2.—The annual dues payable by members, whether Resident or Non-Resident, shall be as follows: by Corporate Members, fifteen dollars; Associates, ten dollars; Juniors, ten dollars.

3.—In addition to the dues prescribed in the preceding section, each Resident Member shall pay annually as follows: Corporate Members, ten dollars; Associates, five dollars; Juniors, five dollars.

4.—A person transferred from any grade to a higher one shall pay the difference between the entrance fees of the two grades, and his annual dues shall be those of the higher grade.

5.—The annual contributions shall become due for the ensuing year on the first day of January, and shall be payable in advance. It shall be the duty of the Secretary to notify each member of the amount due for the ensuing year at the time of giving notice of the Annual Meeting.

6.—Persons elected after six months of any fiscal year shall have expired, shall pay only one-half of the amount of dues for that fiscal year.

7.—All future annual dues may be compounded by a single payment by a Corporate Member of $250; or by an Associate of $150. Should a compounding Associate be elected to Corporate Membership he shall pay the further sum of $100.

Provided, that all compounding Corporate Members or Associates who may be or hereafter become Resident, shall be and remain liable for the annual payment of the difference between the annual dues of Resident and Non-

Resident Corporate Members, or Associates; but any Corporate Member may at any time compound for the future payment of all annual dues of every nature and kind by the payment of $75 in addition to the $250 hereinbefore named; and any Associate may at any time compound for the future payment of all annual dues as Associate by the payment of $40 in addition to the $150 hereinbefore named.

Provided, that any person desiring to compound for future dues shall have paid his entrance fee, all arrears of dues, and the annual dues for the current year, before the compounding sum may be available.

Persons compounding shall sign an agreement that they will be governed by the Constitution and Laws of the Society as they are now formed, or as they may be hereafter altered, amended or enlarged; and that in case of their ceasing to be connected with the Society from any cause whatever, the amount theretofore paid by them for compounding, and for entrance fees and annual dues, shall be the property of the Society.

All moneys thus paid in commutation of annual dues shall be invested as a permanent fund, only the interest thereupon being subject to appropriation for current expenses.

8.—Any person whose dues are more than three months in arrears shall be notified by the Secretary. Should his dues not be paid when they become six months in arrears, he shall lose the right to vote or to receive the publications of the Society. Should his dues become nine months in arrears, he shall again be notified in form prescribed by the Board of Direction, and if such dues become one year in arrears, he shall forfeit his connection with the Society. The Board of Direction, however, may, for cause deemed by it sufficient, extend the time for payment and for the application of these penalties.

9.—The Board of Direction may, for sufficient cause, temporarily excuse from payment of annual dues any member who from ill health, advanced age, or other good reason assigned, is unable to pay such dues; and the Board may remit the whole or part of dues in arrears, or accept in lieu thereof, desirable additions to the Library, or collections.

10.—Every person admitted to the Society shall be considered as belonging thereto and liable for the payment of all dues until he shall have resigned, been expelled, or have been relieved therefrom by the Board of Direction.

11.—Persons elected as Fellows shall become such upon the payment of Two Hundred and Fifty dollars into the permanent funds of the Society. They shall not be liable for other fees and dues.

12.—The status of any present subscribers shall not be changed by the provisions of this Constitution.

ARTICLE V.—Officers.

1.—The officers of the Society shall be a President, four Vice-Presidents, eighteen Directors, a Secretary, and a Treasurer, who, with the five latest living Past-Presidents, who continue to be members, shall constitute the Board of Direction in which the government of the Society shall be vested, and who shall be the Trustees as provided for by the laws under which the Society is organized. For the election of Honorary Members, all the Past-Presidents shall be members of the Board of Direction, except any Past-Pres-

ident who may be disqualified by mental or bodily infirmity, and the evidence of said disqualification shall be a written certificate from his attending physician, or some officer of the Society.

2.—The terms of office of the President, Secretary and Treasurer shall be one year; of the Vice-Presidents, two years; and of the Directors, three years. Provided, however, that at the first election after the adoption of this Constitution, four Vice-Presidents and eighteen Directors shall be elected, of whom two Vice-Presidents and six Directors shall be elected to serve for one year only, and six Directors for two years only; provided, also, that after the first election two Vice-Presidents and six Directors shall be elected each year.

The term of each officer shall begin at the close of the Annual Meeting at which such officer is elected, and shall continue for the period above named or until a successor is duly elected.

3.—A vacancy in the office of President shall be filled by the senior Vice-President.

A vacancy in the office of Vice-President shall be filled by the senior Director. Seniority between persons holding similar offices shall be determined by priority of election to the office, and when these dates are the same, by priority of admission to Corporate Membership; and when the latter dates are identical, the selection shall be made by lot. In case of the disability or neglect in the performance of his duty, of any officer of this Society, the Board of Direction shall have power to declare the office vacant. Vacancies in any office for the unexpired term shall be filled by the Board of Direction, except as provided above.

4.—The President shall be ineligible for re-election. The Vice-Presidents and Directors shall not be eligible for re-election to the same office until at least one full term shall have elapsed after the end of their respective terms.

5.—At least one Vice-President, the Secretary and the Treasurer, and six Directors shall be Resident Corporate Members during their term of office.

ARTICLE VI.—Management.

1.—The President shall have a general supervision of the affairs of the Society. He shall preside at meetings of the Society and of the Board of Direction at which he may be present, and shall be *ex-officio* member of all committees. He shall deliver an address at the Annual Convention.

The Vice-Presidents in order of seniority shall preside at meetings in the absence of the President, and discharge his duties in case of a vacancy in the office.

2.—The Board of Direction shall manage the affairs of the Society in conformity to the laws under which the Society is organized and the provisions of this Constitution. It shall direct the investment and care of the funds of the Society; make appropriations for specific purposes; act upon applications for membership as heretofore provided; take measures to advance the interests of the Society; appoint all its employees; and generally direct its business. The Board of Direction shall make an annual report at the Annual Meeting, transmitting the report of the Treasurer and of other officers, and of Committees.

3.—The Treasurer shall receive all moneys and deposit the same in the name of the Society. He shall invest all funds not needed for current disbursements, as shall be ordered by the Board of Direction. He shall pay all bills, when certified and audited, as provided by this Constitution and by

rules to be prescribed by the Board of Direction. He shall make an annual report and such other reports as may be prescribed by the Board of Direction.

The Board of Direction shall secure a satisfactory surety for the faithful performance of his duties by the Treasurer, and shall renew the same during the month of January of each year.

4.—The Secretary shall be a Corporate Member of the Society. He shall be elected annually by the Board of Direction at the meeting to be held within twenty days after the Annual Meeting provided for in Section 7 of Article VI, or at an adjournment thereof, and shall hold the office for one year or until his successor is elected, provided that a majority of the whole Board of Direction shall be required to elect the Secretary; this vote to be given, if necessary, by letter.

He shall be, under the direction of the President and Board of Direction, the executive officer of the Society.

He will be expected to attend all meetings of the Society and of the Board of Direction; prepare the business therefor, and duly record the proceedings thereof.

He shall see that all moneys due the Society are carefully collected, and without loss transferred to the custody of the Treasurer.

He shall carefully scrutinize all expenditures, and use his best endeavor to secure economy in the administration of the Society.

He shall personally certify the accuracy of all bills or vouchers on which money is to be paid, and shall countersign the checks drawn by the Treasurer against the funds of the Society, when such drafts are known to him to be proper and duly authorized by the Finance Committee.

He shall have charge of the books of account of the Society, and shall furnish monthly to the Board of Direction a statement of receipts and expenses under their several headings, and also a statement of monthly balances. He shall present annually, to the Board of Direction, a balance sheet of his books, as of the 31st of December, and shall furnish, from time to time, such other statements as may be required of him.

He shall conduct the correspondence of the Society and keep full records of the same.

He shall have charge of the Society's house and its contents; shall supervise the work of all employees of the Society, and see that they diligently perform their respective duties.

He shall perform all other duties which may from time to time be assigned to him by the Board of Direction.

5.—The Board of Direction may also, if they deem it necessary, appoint an Assistant Secretary, who shall aid the Secretary and be under his immediate direction in all matters. His whole time shall be given to the Society.

6.—The Secretary and Treasurer shall be paid salaries to be determined by the Board of Direction; but such salaries shall not be reduced during the term of office, as provided in this Constitution. All other salaries shall be fixed, from time to time, by the Board of Direction.

7.—The Board of Direction shall meet within twenty days after the Annual Meeting, and shall then appoint from its members a Finance Committee of five, a Library Committee of five, and a Committee on Publications of five. At

least three members of the Finance Committee, and two members of the other Committees, shall be resident within fifty miles of New York.

These Committees shall report to the Board of Direction, and perform their duties under its supervision.

8.—The Finance Committee shall have immediate supervision of the financial affairs of the Society; shall employ an expert accountant to audit the accounts monthly; shall approve all bills before payment, and shall make recommendations to the Board of Direction as to the investment of moneys, and as to other financial matters.

9.—The Library Committee shall have general supervision of the Library and the House of the Society and the property therein; shall make recommendations to the Board with reference thereto, and shall direct the expenditure for books and other articles of permanent value, of such sums as may be appropriated for these purposes.

10.—The Committee on Publications shall have general supervision of the publications of the Society, and of contracts and expenditures connected therewith.

11.—In the consideration of papers offered for presentation, those papers containing matter readily found elsewhere, those specially advocating personal interests, those carelessly prepared or controverting established facts, and those purely speculative or foreign to the purposes of the Society, shall be rejected. The Committee on Publications shall determine which papers shall be read in full, and which shall be printed after reading by title only. The Committee may return a paper to the writer for correction and emendation, and call to its aid one or more members of special experience relating to the subject treated, either to advise on the paper or to discuss it. Such papers as in the judgment of the Committee should appear in the *Transactions*, shall promptly, upon their acceptance, be printed and distributed to members of all grades; others shall, with the consent of the authors, be suitably indexed, and filed for reference, or the Committee may provide abstracts thereof, which, when approved by the authors, may be published instead of the original papers. Advance copies of papers and discussions may be sent out to the membership before final publication.

12.—Special committees to report upon engineering subjects shall be authorized only by a majority of the votes cast by the Society, and in the following manner: A proposition to appoint such a Committee shall be presented at a regular meeting of the Society, and if sustained, on a motion to refer the same to the Board of Direction, by an affirmative vote of not less than twenty-five Corporate Members, it shall be so referred.

The Board of Direction shall then consider the same and report its recommendations to the Society at the next general business meeting, together with a statement of the arguments for and against the appointment of such Committee.

If a motion for the issue of a letter-ballot thereon receive the affirmative vote of two-thirds of the Corporate Members present, the Board of Direction shall, within thirty days thereafter, issue the letter-ballot, accompanied by a statement of the arguments for and against the proposition.

A majority of a total vote of not less than one-third of the Corporate Membership of the Society shall be necessary for its adoption, whereupon the Committee so authorized shall be appointed by the Board of Direction.

ARTICLE VII.—Nomination and Election of Officers.

1.—The Board of Direction shall, from time to time, divide the territory occupied by the membership into seven geographical districts, to be designated by numbers. District No. 1 shall be the territory within fifty miles of the Post Office in the City of New York. Each of the other six districts shall be, as nearly as practicable, contiguous territory; each shall contain, as nearly as practicable, an equal number of members, and they shall be designated as Districts Nos. 2, 3, 4, 5, 6 and 7. The Board shall announce such division to the Society on or before the first day of May in each year.

2.—At the Annual Meeting of each year, seven Corporate Members, not officers of the Society, one from each of the geographical districts, shall be appointed by the meeting to serve for two years; who, with the five living last Past-Presidents of the Society, shall be a committee to nominate officers for the Society.

The Board of Direction may prescribe the mode of procedure for appointing this Committee.

The Committee so appointed shall meet at the Annual Convention of the Society, and nominate candidates to fill the offices, named in Article V, so as to provide, with the officers holding over, a Vice-President and six Directors residing in District No. 1, and twelve Directors divided equally, with regard to number and residence, among the remaining districts, Nos. 2, 3, 4, 5, 6 and 7.

A list of nominees for the offices to be filled at the next Annual Election shall be presented by the Committee to the Board of Direction within ten days after the nominees have been selected.

3.—Directly after the first of October the aforesaid list of nominees shall be mailed to every Corporate Member whose address is known, provided that if any person shall be found by the Board of Direction to be ineligible for the office for which he is nominated, or should a nominee decline such nomination, his name shall not be sent out, but the Board shall substitute another name therefor. The Board shall also fill any vacancies that may occur in this list of nominees up to the time the ballots are sent out. Vacancies must be so filled as to preserve the geographical distribution of officers prescribed in Section 2 of this article.

4.—At any time before the first day of December, any ten or more Corporate Members may send to the Secretary additional nominations, signed by such members; but nominations so made must comply with Section 2 of this article, regarding the distribution of nominees among the several districts.

5.—At least thirty days before the Annual Meeting, there shall be mailed to every Corporate Member whose address is known a letter-ballot with envelopes for voting. This ballot shall include all the nominations made in accordance with this article. The names and residences of the nominees, their grades of membership, and, in the case of nominees for Directors, the number of the district in which they reside, shall be given. The names of the nominees for any one office shall be arranged alphabetically without distinguishing marks of any kind other than the designations named herein.

Voters may erase names from the printed ballot-list and may substitute the name or names of any other person or persons eligible for any office. But the

number of names for each office on the ballot voted must not exceed the number to be elected at that time to such office, and the vote must be for the proper number of officers resident in each of the seven districts. Ballots not complying with these provisions shall be rejected.

Directions in accordance with these provisions shall be issued with the ballots.

6.—Ballots may be sent by mail to the Secretary, or may be presented to him at the Society House. They must be enclosed in two sealed envelopes, and the outer envelope shall be endorsed by the voter's signature.

The Secretary shall make from the signatures on the outer envelopes a list of the voters from whom ballots are received, which list shall be open to inspection by all Corporate Members. A voter may withdraw his ballot, and may substitute another, at any time before the polls close.

7.—The polls shall be closed at 12 o'clock noon on the first day of the Annual Meeting, and the ballots shall be canvassed publicly by tellers, who shall be appointed by the presiding officer.

The persons of each district who shall receive the highest number of votes for the office for which they are candidates shall be declared elected.

In case of a tie between two or more candidates for the same office, the Annual Meeting shall elect the officer from among the candidates so tied.

The presiding officer shall announce to the meeting the names of the officers elected, in accordance with this section.

ARTICLE VIII.—Meetings.

1.—A Convention of the Society for the reading and discussion of professional papers and for social intercourse shall be held annually at such time and place as the Society may determine.

2.—There shall be two general Business Meetings of the Society each year; the Annual Meeting, which shall be held at the offices of the Society on the third Wednesday in January, and at which the annual reports for the year ending December 31st previous shall be presented, and the ballot for officers canvassed; and a Business Meeting during the Annual Convention, which shall be held at a time and place to be determined by the Board of Direction.

At these meetings thirty Corporate Members shall constitute a quorum.

3.—Business Meetings shall be held monthly on the first Wednesday of each month, except during the months of July and August. At these meetings thirty Corporate Members shall constitute a quorum.

4.—In addition to the Annual Meeting and the Annual Convention, meetings for the reading and discussion of papers shall be held as ordered by the Board of Direction.

5.—Special meetings may be called by the Board of Direction, and shall be so called on the request of thirty Corporate Members, which request shall state the purpose of such meeting. The call for such meetings shall be issued ten days in advance, and shall state the purpose thereof, and no other business shall be taken up at such meeting. At these meetings thirty Corporate Members shall constitute a quorum.

6.—The Society may adopt, from time to time, rules for the order of business at its meetings.

7.—Meetings of the Board of Direction shall be held at the time of the Annual Meeting and of the Annual Convention, at which meeting nine members shall constitute a quorum; and at such other times as the Board may determine, at which five members shall constitute a quorum.

ARTICLE IX.—Amendments.

1.—Proposed amendments to this Constitution must be reduced to writing and signed by not less than five Corporate Members, and be submitted and acted upon as follows:

2.—Amendments presented to the Secretary on or before the first Wednesday in November shall be sent by letter to the several Corporate Members of the Society at least twenty-five days previous to the Annual Meeting. Such amendments shall be in order for discussion at such Annual Meeting, and may be amended in any manner pertinent to the original amendments by a majority vote of the Annual Meeting, and if so amended shall be voted upon by letter-ballot in form as amended by the Annual Meeting; if not so amended, they shall be voted upon by letter-ballot as submitted. The vote to be counted at the first regular meeting in March.

3.—Amendments presented to the Secretary not less than sixty days previous to the date of the Annual Convention shall be sent by letter to the several Corporate Members of the Society at least twenty-five days previous to the Annual Convention. Said amendments shall be in order for discussion at the Business Meeting during such Annual Convention, and may be amended in any manner pertinent to the original amendments by a majority vote of the Business Meeting during the Annual Convention, and, if so amended, shall be voted upon by letter-ballot in form as amended by said Business Meeting; if not so amended, they shall be voted upon by letter-ballot as submitted. The vote to be counted at the first regular meeting in October.

4.—If, after discussion of a proposed amendment, at either of the general meetings of the Society, the meeting shall so decide by a majority vote, it may refer the amendment to a Committee for further consideration, which Committee shall report at the next general meeting, whereupon the amendment shall be voted upon as hereinbefore provided.

5.—An affirmative vote of two-thirds of all ballots cast shall be necessary to the adoption of any amendment.

Amendments so adopted shall take effect thirty days after their adoption, provided that the officers of the Society, at the time any amendment may be adopted, shall continue in office until the next Annual Election.

GENERAL INFORMATION.

MEETINGS.—Regular meetings are held at the House of the Society, No. 220 West Fifty-seventh Street, New York, on the first and third Wednesdays of each month, at 8.30 P. M., except during the summer. The Annual Meeting is held on the third Wednesday in January. A Convention is held annually, at a time and place determined each year by the Society.

The House and Library of the Society are open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

PUBLICATIONS.—The Society issues two publications, *Proceedings* and *Transactions*, which are furnished without extra charge to members of every grade. Subscription price per annum is for *Proceedings*, $6; for *Transactions*, $10. Discount to libraries, book dealers, etc., 25 per cent.

Ten numbers of *Proceedings* are issued during the year, the numbers appearing on the fourth Wednesday of each month except June and July. Each number contains minutes of meetings, announcements of matters of current interest, a classified list of current engineering articles, and a list of new books received in the Library. Papers to be subsequently presented, as well as discussions to which they give rise, are also published in *Proceedings*.

The papers with complete discussions are subsequently republished in the volumes of *Transactions*, which for some years have been issued semi-annually. Each volume contains about 600 pages, and is bound in paper covers; arrangements have also been made for furnishing these volumes bound in standard cloth (50 cents), or half morocco ($1), to members or subscribers who desire to pay for them in that form.

PROFESSIONAL PAPERS.—Papers and discussions on subjects of engineering interest are invited by the Board of Direction from all persons, whether members of the Society or not, subject to proper editorial supervision. Under the Constitution, matter which may be readily found elsewhere, advocates personal interests, is carelessly prepared, controverts established facts, or is purely speculative or foreign to the purposes of the Society, must be excluded.

All papers, on their acceptance by the Committee on Publications, become the property of the Society.

ADDITIONS TO LIBRARY.—It is desirable that copies of books on engineering subjects, and of reports of municipal, railway, canal, water supply and all other public works, be added to the Library. Members of the Society and all who feel an interest in the proper maintenance of a technical reference library, are asked to donate engineering books or reports.

ADMISSION TO MEMBERSHIP.—The requirements for each of the grades of membership may be found on pages 5 and 6.

For blank forms and other information, address the Secretary, at the Society House.

FEES AND DUES.	RESIDENT.				NON-RESIDENT.			
	Members.	Associate Members.	Associates.	Juniors.	Members.	Associate Members.	Associates.	Juniors.
Entrance Fee	$30.00	$25.00	$20.00	$10.00	$30.00	$25.00	$20.00	$10.00
Yearly Assessment	25.00	25.00	15.00	15.00	15.00	15.00	10.00	10 00
Total, payable upon Election	$55.00	$50.00	$35.00	$25.00	$45.00	$40.00	$30.00	$20.00

Fellowship fee, $250 in one payment for life.

Annual dues are payable in advance on the 1st day of January.

Members elected during the last half of the year pay only one-half of the amount of dues for that year.

COMPOUNDING DUES.—The annual dues of a Corporate Member may be compounded by a single payment of $250; of an Associate by a payment of $150. Should a compounding Associate be elected to Corporate Membership, an additional payment of $100 is necessary.

All compounding Corporate Members or Associates, who may be or hereafter become Resident, remain liable for the annual payment of the difference between the annual dues of Resident and Non-Resident Corporate Members or Associates; but any Corporate Member may at any time compound for the future payment of all annual dues of every nature and kind by the payment of $75 in addition to the $250 hereinbefore named; and any Associate may at any time compound for the future payment of all annual dues as Associate by the payment of $40 in addition to the $150 hereinbefore named.

Any person compounding his dues must have paid his entrance fee, all arrears of dues, and the annual dues for the current year, before the compounding sum can be accepted.

Persons compounding shall sign an agreement that they will be governed by the Constitution and Laws of the Society as they are now formed, or as they may be hereafter altered, amended or enlarged; and that in case of their ceasing to be connected with the Society from any cause whatever, the amount theretofore paid by them for compounding, and for entrance fees and annual dues, shall be the property of the Society.

GENERAL INFORMATION.

CERTIFICATES OF MEMBERSHIP.—The prices, to cover cost of Certificates, are as follows:

Parchment	$2.25
Parchment Paper	1.25
Plate Paper	1.25

Certificates are not issued to Juniors.

BADGE.—This is of gold and enameled, with the member's name and membership number engraved on the back, and is mounted either as an ordinary pin, a scarf pin, a watch charm, or a button. The price is $6 for either of the first three or $6.50 for the button. Badges can be secured only upon application to the Secretary. They are not issued to Juniors.

REMITTANCES.—All remittances should be made payable to the order of the American Society of Civil Engineers. They should be in drafts on New York, in Postal Money Orders payable at the New York Post-Office (not at a branch office), or Express Money Orders.

THE SEVEN GEOGRAPHICAL DISTRICTS INTO WHICH THE TERRITORY OCCUPIED BY THE MEMBERSHIP IS DIVIDED, UNDER ART. VII, SEC. 1, OF THE CONSTITUTION.

District No. 1.—The territory within 50 miles of the Post-Office in the City of New York.

District No. 2.—The States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut (except as included in District No. 1), and all countries in Europe.

District No. 3.—The States of New York and New Jersey (except as included in District No. 1), and the Dominion of Canada.

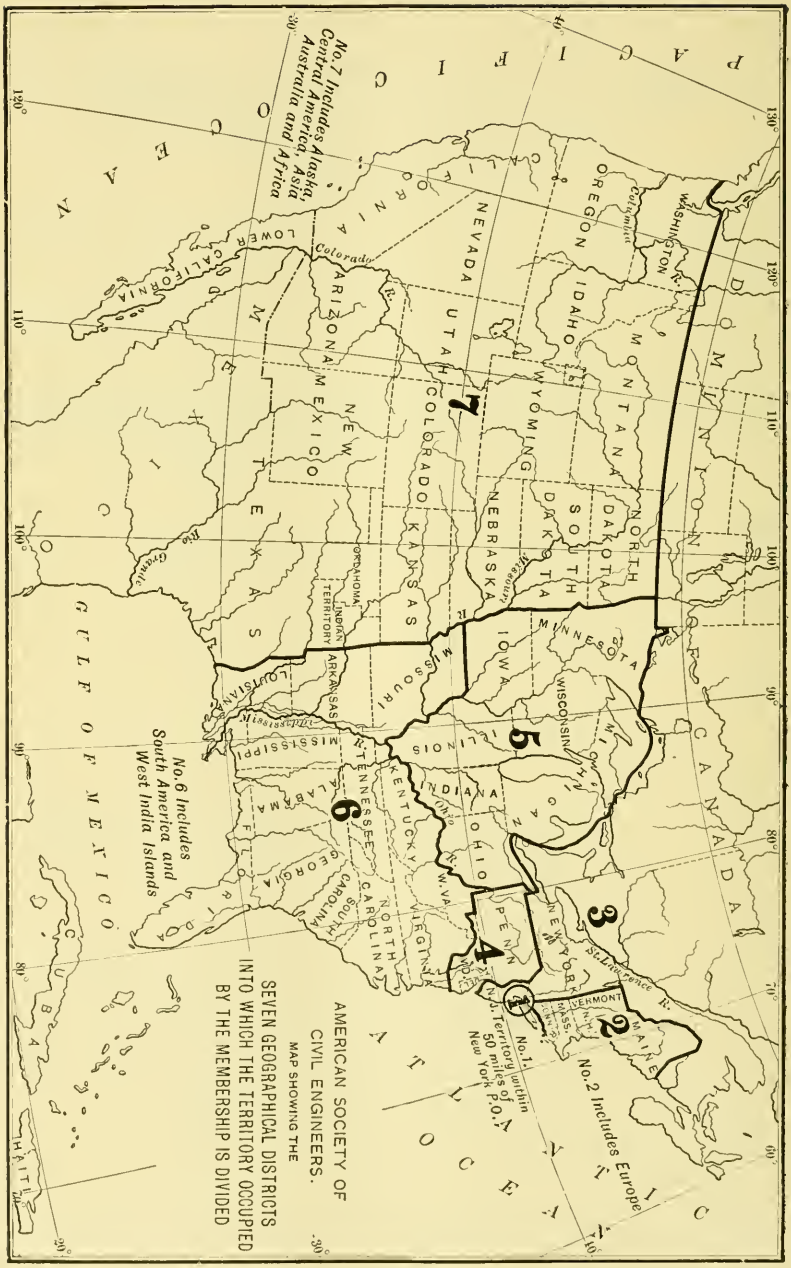
District No. 4.—The States of Pennsylvania, Delaware and Maryland and the District of Columbia.

District No. 5.—The States of Ohio, Indiana, Illinois, Michigan, Wisconsin, Iowa and Minnesota.

District No. 6.—The States of Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Missouri, Arkansas and Louisiana, the West India Islands, and all countries in South America.

District No. 7.—The States of North Dakota, South Dakota, Nebraska, Kansas, Texas, Montana, Wyoming, Colorado, Idaho, Utah, Washington, Oregon, California and Nevada; the following territories: Indian Territory, Oklahoma, New Mexico, Arizona and Alaska; the Republic of Mexico, and all countries in Central America, Asia, Australasia and Africa.

These Districts are shown on the map on the next page.



AMERICAN SOCIETY OF CIVIL ENGINEERS.

MAP SHOWING THE SEVEN GEOGRAPHICAL DISTRICTS INTO WHICH THE TERRITORY OCCUPIED BY THE MEMBERSHIP IS DIVIDED

RULES GOVERNING THE AWARD OF THE NORMAN MEDAL, THE THOMAS FITCH ROWLAND PRIZE AND THE COLLINGWOOD PRIZE.

Prizes.

There are at present three endowed prizes for papers published in the *Transactions* of the American Society of Civil Engineers. These prizes are awarded annually.

With the assent and the approval of the donors, by action of the Board of Direction, June 1st, 1897, the Society assumes the responsibility for the payment in perpetuity of the Norman Medal, Thomas Fitch Rowland Prize and Collingwood Prize.

Committee on Prizes.

1. The Board of Direction shall appoint annually, not later than its regular meeting in June of each year, three Corporate Members of the Society, not members of the Board of Direction, who shall form a Committee to recommend the award of all prizes during the year.

2. The papers considered shall include all papers published in the *Transactions* during the year ending with the month of July.

3. The Committee on Prizes shall report its recommendation to the Board of Direction on or before December 31st, and the awards shall be made by the Board of Direction.

4. The announcement of the awards shall be made at the Annual Meeting.

5. The Secretary of the Society shall act as Secretary to the Committee on Prizes, but shall have no vote or voice in its deliberations.

Code of Rules.

The Norman Medal.—The Norman Medal was instituted and endowed in 1874 by the late George H. Norman, M. Am. Soc. C. E.

I. Competition for the Norman Medal of the American Society of Civil Engineers shall be restricted to members of the Society.

II. There shall be one gold medal awarded as hereinafter provided. The dies therefor shall be deposited with the Superintendent of the United States Mint at Philadelphia, in trust exclusively for the above purpose. Such medal shall be of a value of $60.

III. All original papers presented to the Society by members of any class, and published in the *Transactions* during the year for which the medal is awarded, shall be open to the award, provided that such papers shall not have been previously contributed in whole or in part to any other association, nor have appeared in print prior to their publication by the Society, nor have been published in the *Transactions* in any previous year.

IV. The medal shall be awarded to a paper which shall be judged worthy of special commendation for its merit as a contribution to engineering science.

MEDALS AND PRIZES.

The Thomas Fitch Rowland Prize.—The Thomas Fitch Rowland Prize was originally instituted by the Society at the Annual Meeting of 1882. It was endowed in 1884 by Thomas Fitch Rowland, Hon. M. Am. Soc. C. E. Its award is not restricted to members of the Society.

I. The prize shall consist of $60 in cash, with an engraved certificate signed by the President and Secretary of the Society.

II. In the award of this prize preference shall be given to papers describing in detail accomplished works of construction, their cost and errors in design and execution.

The Collingwood Prize for Juniors.—The Collingwood Prize for Juniors was instituted and endowed in 1894 by Francis Collingwood, M. Am. Soc. C. E.

I. The competition for the prize shall be restricted to the Juniors of the Society.

II. The prize shall consist of $50 in cash, with an engraved certificate, signed by the President and the Secretary of the Society.

III. The prize shall be awarded to a paper describing an engineering work with which the writer has been directly connected, or it shall record investigations contributing to engineering knowledge, some essential part of which was made by the writer, and contain a rational digest of results. Any mathematical treatment must show immediate adaptability to professional practice. Accuracy of language and excellence of style will be factors in the award.

IV. These rules may be modified by the Board of Direction.

The awards of the Norman Medal, the Thomas Fitch Rowland Prize, and the Collingwood Prize are indicated in the List of Members by the letters N., R. and C., respectively, prefixed to the name of each recipient.

AWARDS OF THE NORMAN MEDAL.

1874. J. James R. Croes, for paper "Memoir of the Construction of a Masonry Dam." Vol. III,* p. 337.
1875. Theodore G. Ellis, for paper "Description and Results of Hydraulic Experiments with Large Apertures, at Holyoke, Mass., in 1874." Vol. V,* p. 19.
1877. William W. Maclay, for paper "Notes and Experiments on the Use and Testing of Portland Cement." Vol. VI,* p. 311.
Book Prize awarded to Julius H. Striedinger, for paper "On Igniting Blasts by Means of Electricity." Vol. VII,* p. 1.
1879. Edward P. North, for paper "The Construction and Maintenance of Roads." Vol. VIII,* p. 95.
Book Prize awarded to Max E. Schmidt, for paper "Notes on the South Pass Jetties." Vol. VIII,* p. 189.
1880. Theodore Cooper, for paper "The Use of Steel for Bridges." Vol. VIII,* p. 263.
1881. L. L. Buck, for paper "The Re-Enforcement of the Anchorage and Renewal of the Suspended Superstructure of the Niagara Railroad Suspension Bridge." Vol. X,* p. 195.
1882. A. Fteley and F. P. Stearns, for paper "Description of Some Experiments on the Flow of Water Made during the Construction of Works for Conveying the Water of Sudbury River to Boston." Vol. XII,* p. 1.
1883. William P. Shinn, for papers "On the Increased Efficiency of Railways for the Transportation of Freight." Vol. XI,* p. 365; and "How can Railways be made more Efficient in the Transportation of Freight?" Vol. XII,* p. 189.
1884. James Christie, for paper "Experiments on the Strength of Wrought-Iron Struts." Vol. XIII,* p. 85.
1885. Eliot C. Clarke, for paper "Record of Tests of Cement Made for Boston Main Drainage Works." Vol. XIV,* p. 141.
1886. Edward Bates Dorsey, for paper "English and American Railroads Compared." Vol. XV,* p. 1.
1887. Desmond FitzGerald, for paper "Evaporation." Vol. XV,* p. 581.
1888. E. E. Russell Tratman, for paper "English Railroad Track." Vol. XVIII,* p. 217.
1889. Theodore Cooper, for paper "American Railroad Bridges." Vol. XXI,* p. 1.
1890. John R. Freeman, for paper "Experiments Relating to the Hydraulics of Fire Streams." Vol. XXI,* p. 303.
1891. John R. Freeman, for paper "The Nozzle as an Accurate Water Meter." Vol. XXIV,* p. 492.
1892. William Starling, for paper "Some Notes on the Holland Dikes." Vol. XXVI,* p. 559.
1893. Desmond FitzGerald, for paper "Rainfall, Flow of Streams, and Storage." Vol. XXVII,* p. 253.
1894. Alfred E. Hunt, for paper "A Proposed Method of Testing Structural Steel." Vol. XXX,* p. 181.
1895. William Ham. Hall, for paper "The Santa Ana Canal of the Bear Valley Irrigation Company." Vol. XXXIII,* p. 61.
1896. John E. Greiner, for paper "What is the Life of an Iron Railroad Bridge?" Vol. XXXIV,* p. 294.
1897. Julius Baier, for paper "Wind Pressures in the St. Louis Tornado, with Special Reference to the Necessity of Wind Bracing for High Buildings." Vol. XXXVII,* p. 221.
1898. B. F. Thomas, for paper "Movable Dams." Vol. XXXIX,* p. 431.
1899. E. Herbert Stone, for paper "The Determination of the Safe Working Stress for Railway Bridges of Wrought Iron and Steel." Vol. XLI,* p. 467.
1900. James A. Seddon, for paper "River Hydraulics." Vol. XLIII,* p. 179.
1902. Gardner S. Williams, Clarence W. Hubbell and George H. Fenkell, for paper "Experiments at Detroit, Mich., on the effect of Curvature upon the Flow of Water in Pipes." Vol. XLVII,* p. 1.
1904. Emile Low, for paper "The Breakwater at Buffalo, New York." Vol. LII,* p. 73.

* *Transactions*, Am. Soc. C. E.

AWARDS OF THE THOMAS FITCH ROWLAND PRIZE.*

1883. G. Lindenthal, for paper "Rebuilding the Monongahela Bridge, at Pittsburgh, Pa." Vol. XII,† p. 353.
1884. Hamilton Smith, Jr., for paper "Water Power with High Pressures and Wrought-Iron Water Pipe." Vol. XIII,† p. 15.
1885. A. M. Wellington, for paper "Experiments with New Apparatus on Journal Friction at Low Velocities." Vol. XIII,† p. 409.
1886. Charles C. Schneider, for paper "The Cantilever Bridge at Niagara Falls." Vol. XIV,† p. 499.
1887. William Metcalf, for paper "Steel: Its Properties; Its Use in Structures and in Heavy Guns." Vol. XVI,† p. 283.
1888. Clemens Herschel, for paper "The Venturi Water Meter: An Instrument Making Use of a New Method of Gauging Water; Applicable to the Cases of Very Large Tubes, and of a Small Value Only, of the Liquid to be Gauged." Vol. XVII,† p. 228.
1889. James D. Schuyler, for paper "The Construction of the Sweetwater Dam." Vol. XIX,† p. 201.
1890. O. Chanute, John F. Wallace and William H. Breithaupt, for paper "The Sibley Bridge." Vol. XXI,† p. 97.
1891. William H. Burr, for paper "The River Spans of the Cincinnati and Covington Elevated Railway, Transfer and Bridge Company." Vol. XXIII,† p. 47.
1892. Samuel M. Rowe, Stillman W. Robinson and Henry H. Quimby, for paper "Red Rock Cantilever Bridge." Vol. XXV,† p. 662.
1893. William Murray Black, for paper "The Improvement of Harbors on the South Atlantic Coast of the United States." Vol. XXIX,† p. 223.
1894. David L. Barnes, for paper "Distinctive Features and Advantages of American Locomotive Practice." Vol. XXIX,† p. 385.
1895. William R. Hill, for paper "The Water-Works of Syracuse, N. Y." Vol. XXXIV,† p. 23.
1896. H. St. L. Coppée, for paper "Bank Revetment on the Lower Mississippi." Vol. XXXV,† p. 141.
1897. Arthur L. Adams, for paper "The Astoria (Oregon) City Water-Works." Vol. XXXVI,† p. 1.
1898. Henry Goldmark, for paper "The Power Plant, Pipe Line and Dam of the Pioneer Electric Power Company at Ogden, Utah." Vol. XXXVIII,† p. 246.
1899. R. S. Buck, for paper "The Niagara Railway Arch." Vol. XL,† p. 125.
1900. Allen Hazen, for paper "The Albany Water Filtration Plant." Vol. XLIII,† p. 244.
1901. L. G. Montony, for paper "The Ninety-Sixth Street Power Station of the Metropolitan Street Railway Company, of New York City." Vol. XLIV,† p. 119.
1902. William W. Harts, for paper "Description of Coos Bay, Oregon, and the Improvement of Its Entrance by the Government." Vol. XLVI,† p. 482.
1903. George W. Fuller, for paper "The Filtration Works of the East Jersey Water Company, at Little Falls, New Jersey." Vol. L,† p. 394.
1904. George Cecil Kenyon, for paper "Dock Improvements at Liverpool." Vol. LII,† p. 36.

* This prize was known as the Rowland Prize from 1883 to 1896 and consisted of $50. Beginning with the award for 1897 it is to be known as the Thomas Fitch Rowland Prize and consists of $60, with an engraved certificate signed by the President and Secretary of the Society.

† *Transactions*, Am. Soc. C. E.

AWARDS OF THE COLLINGWOOD PRIZE FOR JUNIORS.

1895. Morton L. Byers, for paper "The Renewal of the Channel Pier of the Cincinnati and Muskingum Valley Railway Bridge over the Scioto River." Vol. XXXI,† p. 361.

1896. Herbert Waldo York, for paper "The Twenty-Eighth Street Central Station of the United Electric Light and Power Company." Vol. XXXV,† p. 429.

1899. Julius Kahn, for paper "The Coal Hoists of the Calumet and Hecla Mining Company." Vol. XLI,† p. 269.

1900. Robert P. Woods, for paper "Street Grades and Cross-Sections in Asphalt and Cement." Vol. XLII,† p. 1.

1901. F. A. Kummer, for paper "A Proposed Method for the Preservation of Timber." Vol. XLV,† p. 181.

1903. Isaac Harby, for paper "The Footbridge for Building the Cables of the New East River Bridge." Vol. XLIX,† p. 165.

1904. Herbert J. Wild, for paper "The Substructure of Marsh River Bridge." Vol. LII,† p. 451.

† *Transactions*, Am. Soc. C. E.

LOCATION AND DATE OF ANNUAL CONVENTIONS.

Number.	Location.	Date.
First,	New York, N. Y.,	June, 1869
Second,	New York, N. Y.,	June, 1870
Third,	New York, N. Y.,	June, 1871
Fourth,	Chicago, Ill.,	June, 1872
Fifth,	Louisville, Ky.,	May, 1873
Sixth,	New York, N. Y.,	June, 1874
Seventh,	Pittsburg, Pa.,	June, 1875
Eighth,	Philadelphia, Pa.,	June, 1876
Ninth,	New Orleans, La.,	April, 1877
Tenth,	Boston, Mass.,	June, 1878
Eleventh,	Cleveland, Ohio,	June, 1879
Twelfth,	St. Louis, Mo.,	May, 1880
Thirteenth,	Montreal, Que., Canada,	June, 1881
Fourteenth,	Washington, D. C.,	May, 1882
Fifteenth,	St. Paul and Minneapolis, Minn.,	June, 1883
Sixteenth,	Buffalo, N. Y.,	June, 1884
Seventeenth,	Deer Park, Md.,	June, 1885
Eighteenth,	Denver, Colo.,	July, 1886
Nineteenth,	Hotel Kaaterskill, N. Y.,	July, 1887
Twentieth,	Milwaukee, Wis.,	June, 1888
Twenty-first,	Seabright, N. J.,	June, 1889
Twenty-second,	Cresson, Pa.,	June, 1890
Twenty-third,	Lookout Mountain, Tenn.,	May, 1891
Twenty-fourth,	Old Point Comfort, Va.,	June, 1892
Twenty-fifth,	Chicago, Ill.,	July, 1893
Twenty-sixth,	Niagara Falls, N. Y.,	June, 1894
Twenty-seventh,	Hotel Pemberton, Hull, Mass.,	June, 1895
Twenty-eighth,	San Francisco, Cal.,	June, 1896
Twenty-ninth,	Quebec, Que., Canada,	June, 1897
Thirtieth,	Detroit, Mich.,	July, 1898
Thirty-first,	Cape May, N. J.,	June, 1899
Thirty second,	London, England,	July, 1900
Thirty-third,	Niagara Falls, N. Y.,	June, 1901
Thirty-fourth,	Washington, D. C.,	May, 1902
Thirty-fifth,	Asheville, N. C.,	June, 1903
Thirty sixth,	St. Louis, Mo.,	October, 1904

LIST OF MEMBERS.

AUTHORIZED ABBREVIATIONS.

HONORARY MEMBER	Hon. M. Am. Soc. C. E.
MEMBER	M. Am. Soc. C. E.
ASSOCIATE MEMBER	Assoc. M. Am. Soc. C. E.
ASSOCIATE	Assoc. Am. Soc. C. E.
JUNIOR	Jun. Am. Soc. C. E.
FELLOW	F. Am. Soc. C. E.

The Board of Direction requests the use of these abbreviations in all cases.

The awards of the Norman Medal, the Thomas Fitch Rowland Prize, and the Collingwood Prize, are indicated in this list by the letters N., R. and C., respectively, prefixed to the name of each recipient.

It is particularly requested that every change of address be communicated immediately to: The Secretary, American Society of Civil Engineers, 220 West Fifty-seventh Street, New York, N. Y.

PAST-PRESIDENTS.

James Laurie	Nov.	5, 1852,	to Nov.	6, 1867.
James Pugh Kirkwood	Nov.	6, 1867,	to Aug.	5, 1868.
William Jarvis McAlpine	Aug.	5, 1868,	to Nov.	3, 1869.
Alfred Wingate Craven	Nov.	3, 1869,	to Nov.	1, 1871.
Horatio Allen	Nov.	1, 1871,	to Nov.	5, 1873.
Julius Walker Adams	Nov.	5, 1873,	to Nov.	3, 1875.
George Sears Greene	Nov.	3, 1875,	to Nov.	7, 1877.
Ellis Sylvester Chesbrough	Nov.	7, 1877,	to Nov.	6, 1878.
William Milnor Roberts	Nov.	6, 1878,	to Nov.	5, 1879.
Albert Fink	Nov.	5, 1879,	to Nov.	3, 1880.
James Bicheno Francis	Nov.	3, 1880,	to Jan.	18, 1882.
Ashbel Welch	Jan.	18, 1882,	to Sept.	25, 1882.*
CHARLES PAINE	Jan.	17, 1883,	to Jan.	16, 1884.
DON JUAN WHITTEMORE	Jan.	16, 1884,	to Jan.	21, 1885.
Frederic Graff	Jan.	21, 1885,	to Jan.	20, 1886.
Henry Flad	Jan.	20, 1886,	to Jan.	19, 1887.
William Ezra Worthen	Jan.	19, 1887,	to Jan.	18, 1888.
THOMAS COLTRIN KEEFER	Jan.	18, 1888,	to Jan.	16, 1889.
Max Joseph Becker	Jan.	16, 1889,	to Jan.	15, 1890.
William Powell Shinn	Jan.	15, 1890,	to Jan.	21, 1891.
OCTAVE CHANUTE	Jan.	21, 1891,	to Jan.	20, 1892.
MENDES COHEN	Jan.	20, 1892,	to Jan.	18, 1893.
WILLIAM METCALF	Jan.	18, 1893,	to Jan.	17, 1894.
WILLIAM PRICE CRAIGHILL	Jan.	17, 1894,	to Jan.	16, 1895.
George Shattuck Morison	Jan.	16, 1895,	to Jan.	15, 1896.
Thomas Curtis Clarke	Jan.	15, 1896,	to Jan.	20, 1897.
BENJAMIN MORGAN HARROD	Jan.	20, 1897,	to Jan.	19, 1898.
Alphonse Fteley	Jan.	19, 1898,	to Jan.	18, 1899.
DESMOND FITZGERALD	Jan.	18, 1899,	to Jan.	17, 1900.
JOHN FINDLEY WALLACE	Jan.	17, 1900,	to Jan.	16, 1901.
JOHN JAMES ROBERTSON CROES	Jan.	16, 1901,	to Jan.	15, 1902.
ROBERT MOORE	Jan.	15, 1902,	to Jan.	21, 1903.
ALFRED NOBLE	Jan.	21, 1903,	to Jan.	20, 1904.
CHARLES HERMANY	Jan.	20, 1904,	to Jan.	18, 1905.

In this list, the names of deceased Past-Presidents are printed in italics.
* Mr. Ashbel Welch died September 25, 1882, during his term of office as President.

OFFICERS, 1905.

PRESIDENT

C. C. SCHNEIDER.

VICE-PRESIDENTS

Term expires January, 1906

F. S. CURTIS, S. L. F. DEYO.

Term expires January, 1907

M. L. HOLMAN, EMIL KUICHLING.

SECRETARY

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DIRECTORS

Term expires January, 1906

ALFRED CRAVEN, JOSEPH O. OSGOOD, GEORGE S. DAVISON, E. C. LEWIS, HUNTER McDONALD, ELWOOD MEAD.

Term expires January, 1907

CHARLES S. GOWEN, NELSON P. LEWIS, JOHN W. ELLIS, GEORGE S. WEBSTER, RALPH MODJESKI, CHARLES D. MARX.

Term expires January, 1908

AUSTIN L. BOWMAN, MORRIS R. SHERRERD, HEZEKIAH BISSELL, EDWIN A. FISHER, WILLIAM B. LANDRETH, GEORGE S. PIERSON.

PAST-PRESIDENTS

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Standing Committees of the Board of Direction.

The President is *ex officio* a member of all committees

On Finance:

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On Library:

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JOHN D. ISAACS,
RICHARD MONTFORT,
H. G. PROUT,
PERCIVAL ROBERTS, JR.,
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ROBERT W. LESLEY,
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EMIL SWENSSON,
A. N. TALBOT,
J. R. WORCESTER.

CLASSIFIED LIST.

HONORARY MEMBERS.

[Hon. M. Am. Soc. C. E.]

		Date of Membership.
BAKER, *Sir* BENJAMIN. 2 Queen Square Pl., Queen Anne's Mansions, Westminster, London, S. W., England		May 5, 1897
CRAIGHILL, WILLIAM PRICE. (*Past-President*). Retired Chf. of Engrs. and Brig.-Gen., U. S. A., Charlestown, Jefferson Co., W. Va.	M.	Oct. 7, 1885
	Hon. M.	Mar. 23, 1896
DAVIDSON, GEORGE. Prof. of Geography, Univ. of California, San Francisco, Cal.		May 5, 1897
FOX, *Sir* DOUGLAS. 28 Victoria St., Westminster, London, S. W., England	Cor. M.	June 7, 1871
	Hon. M.	Mar. 5, 1901
FRITZ, JOHN. Bethlehem, Pa.	M.	July 5, 1893
	Hon. M.	Sept. 5, 1899
GORSUCH, ROBERT BENNETT. Apartado del Correo 226, City of Mexico, Mexico.		Jan. 9, 1905
GRAY, GEORGE EDWARD. Cons. Engr., 1155 Bush St., San Francisco, Cal.	M.	July 2, 1873
	Hon. M.	June 5, 1894
MELVILLE, GEORGE WALLACE. Rear-Admiral, U. S. N. (*Retired*), 615 Walnut St., Philadelphia, Pa.		Dec. 20, 1899
ROWLAND, THOMAS FITCH. Pres., The Continental Iron Works, Brooklyn, N. Y. (Res., 329 Madison Ave., New York City)	M.	Dec. 4, 1867
	Hon. M.	Dec. 20, 1899
WHITE, *Sir* WILLIAM HENRY. Cedarcroft, Bristol Gardens, Putney Heath, S. W., London, England		Dec. 16, 1904

Honorary Members, 10.

CORRESPONDING MEMBERS.

	Date of Membership.
GLEIM, CHARLES OTTO. Civ. and Cons. Engr., 184 Dorotheen-Strasse, Hamburg, Germany	April 5, 1876
PONTZEN, ERNEST. Civ. and Cons. Engr., 65 Rue Monceau, Paris, France	Jan. 5, 1876

Corresponding Members, 2.

MEMBERS.

[M. Am. Soc. C. E.]

Date of Membership.

ABBOT, FREDERIC VAUGHAN. Maj., Corps of Engrs., U. S. A., Office, Chf. of Engrs., Washington, D. C. ..... Dec. 3, 1884

ABBOT, FREDERICK WILLIAM. Pres., Abbot-Gamble Contr. Co., 32 Broadway, New York City ..... Assoc. M. Oct. 7, 1891; M. April 1, 1896

ABBOTT, ARTHUR VAUGHAN. 8 Bridge St., New York City ..... Jun. Jan. 5, 1881; M. Dec. 4, 1901

ABBOTT, FRED WALTER. (Sax & Abbott), 303 Hale Bldg., Philadelphia, Pa. ..... Sept. 7, 1904

ADAM, ROBERT. Puente de Alverado No. 15, City of Mexico, Mexico .. May 2, 1900

R. ADAMS, ARTHUR LINCOLN. Cons. Hydr. Engr., Kohl (Hayward) Bldg., San Francisco, Cal ..... Oct. 2, 1895

ADAMS, EDWIN GRIGGS, Jr. Cons. Civ. and Mech. Engr. (Adams & Knowles), No. 2, The Bund, Tientsin, China ..... Assoc. M. Jan. 1, 1896; M. Jan. 31, 1905

ADGATE, GEORGE. Western Mgr., Foundation & Contr. Co., 509 McCague Bldg., Omaha, Nebr. ..... April 1, 1896

AERTSEN, GUILLIAEM. Gen. Mgr., Latrobe Steel Co., 1200 Girard Bldg., Philadelphia, Pa. ..... Oct. 1, 1890

AFRICA, JAMES MURRAY. Cons. Engr.; City Engr., Huntingdon, Pa.; City Engr., Lewistown, Pa. ..... Sept. 2, 1896

AHERN, JEREMIAH. Engr., U. S. Reclamation Service, Cody, Wyo. .... May 4, 1904

AIKEN, WILLIAM AUGUSTIN. Gen. Insp. of Material, Rapid Transit R. R. Commrs., City of New York, 613 Empire Bldg., Pittsburg, Pa. ..... Oct. 2, 1889

AIMS, WALTON IRVING. Chf. Engr., New York Tunnel Co., Battery Park, New York City ..... May 4, 1904

ALBERTSON, CHARLES. Bangor, Pa ..... Jun. Oct. 1, 1895; Assoc. M. Mar. 1, 1899; M. Oct. 7, 1903

ALDEN, CHARLES AMES. Street Ry. Engr. of F. and S. Dept., Penn. Steel Co., Steelton, Pa ..... Assoc. M. May 4, 1898; M. Sept. 6, 1904

ALDEN, JOHN FERRIS. Cons. Engr., Rochester, N. Y. ..... July 6, 1887

ALDERMAN, CHARLES ALDO. Interurban Union Station, Columbus, Ohio ..... Assoc. M. April 6, 1898; M. April 2, 1902

ALDRICH, TRUMAN HEMINWAY. 1739 P St., N. W., Washington, D. C. May 4, 1881

ALFRED, FRANK HOOKER. Chf. Engr., Pere Marquette R. R., Detroit, Mich. ..... June 3, 1903

ALLAN, PERCY. Public Works Dept., Sydney, New South Wales, Australia ..... Assoc. M. April 1, 1896; M. Oct. 1, 1902

Date of Membership.

ALLEN, C. FRANK. Prof. of R. R. Eng., Mass. Inst. Tech., Boston, Mass. — Feb. 6, 1878

ALLEN, CALVIN HARLOW. 1 West 72d St., New York City — Sept. 7, 1887

ALLEN, CHARLES ALBERT. Cons. Engr., 44 Front St., Worcester, Mass. — June 4, 1879

ALLEN, HENRY CLAYTON. Special Deputy State Engr., De Graaf Bldg., Albany (Res. 206 Delaware St., Syracuse), N. Y. — Assoc. M. July 1, 1891; M. Jan. 3, 1905

ALLEN, JAMES PIERSON. U. S. Asst. Engr., 8 Ladson St., Charleston, S. C. — Jun. Mar. 5, 1879; M. June 4, 1884

ALLEN, KENNETH. Engr. and Supt. of Water Dept., City Hall, Atlantic City, N. J. — May 2, 1888

ALLEN, WILLIAM ANDREW. Engr., United Lead Co., 71 Broadway, New York City. — Assoc. M. Feb. 6, 1901; M. Sept. 6, 1904

ALLEN, WILLIAM BULLARD. Land Agt., Tennessee Coal, Iron & R. R. Co., Birmingham, Ala. — Feb. 3, 1904

ALMIRALL, RAYMOND FRANCIS. Archt., 51 Chambers St., New York City. — Oct. 5, 1904

ALVORD, JOHN WATSON. Hydr. and San Engr., 1207 Hartford Bldg., Chicago, Ill. — Jan. 4, 1893

AMBROSE, WILLIAM CREELMAN. 2604 Dana St., Berkeley, Cal. — April 4, 1888

AMWEG, FREDERICK JAMES. Engr. and Mgr., Am.-Hawaiian Eng. & Constr. Co., Ltd., 907 Rialto Bldg., San Francisco, Cal. — Mar. 7, 1888

ANDERSEN, CHRISTIAN. Engr., U. S. Geological Survey, Spokane, Wash. — Jan. 2, 1901

ANDREWS, DANIEL MARSHALL. U. S. Asst. Engr., Care, U. S. Engr. Office, Montgomery, Ala. — Mar. 2, 1892

ANDREWS, DAVID HERBERT. Pres., The Boston Bridge Works, Inc.; 38 Lake Ave., Newton Center, Mass. — Sept. 2, 1885

ANDREWS, HORACE. Cons. Engr., 125 Lancaster St., Albany, N. Y. — April 6, 1887

ANGIER, WALTER EUGENE. Res. Engr., Thebes Bridge (So. Ill. & Mo. Bridge Co.), Thebes, Ill. — Assoc. M. Sept. 7, 1892; M. Sept. 3, 1902

ANNAN, CHARLES LE ROY. Office Engr., Dept. of Public Works, St. Paul, Minn. — July 4, 1888

ANTHONY, CHARLES, Jr. Cons. Engr., Town Hall, East London, Cape Colony, South Africa — Mar. 5, 1902

APPLETON, THOMAS. Supt. of Constr., U. S. Post Office, Holyoke, Mass — April 4, 1883

ARCHBALD, JAMES. Cons. Engr., 424 Jefferson Ave., Scranton, Pa. — May 15, 1872

ARCHER, WILLIAM. Care, Gen. Office, B. & O. S. W. R. R., Cincinnati, Ohio — Mar. 2, 1881

ARCHIBALD, PETER SUTHER. Cons. Engr., Moncton, N. B., Canada. — Jan. 7, 1885

ARENTZ, FREDERICK CHRISTIAN HOLBERG. Chf. Engr., The Joliet Bridge & Iron Co., 821 Oneida St., Joliet, Ill. — Assoc. M. May 6, 1891; M. Oct. 3, 1900

ARGOLLO, MIGUEL DE TEIVE E. Director and Chf. Engr., San Francisco R. R., Alagoinhas, Bahia, Brazil. — Oct. 2, 1895

ARMINGTON, JAMES HERVEY. Cons. Engr., East Providence, R. I. — July 6, 1870

ARTINGSTALL, SAMUEL GEORGE. 18 South Hamilton Ave., Chicago, Ill. — Oct. 6, 1886

Date of Membership.

Ashmead, Frank Milligan. Engr., R. of W., B. & A. V. Div., P. R. R., 98 Johnson Park, Buffalo, N. Y. ..... July 6, 1887

Aspinwall, Thomas. 3 Hamilton Pl., Boston, Mass. ..... May 2, 1888

Asserson, Henry Raymond. Chf. Engr. of Sewers, Borough of Brooklyn, Room 44, Municipal Bldg., Brooklyn (Res., Floral Park), N. Y. ..... Oct. 2, 1901

Asserson, Peter Christian. Civ. Engr., U. S. N. (*Retired*), Montauk Ave., New London, Conn. ..... July 5, 1882

Atkinson, John Bond. Pres., St. Bernard Min. Co., Earlington, Ky. ..... Sept. 5, 1877

Atwater, Almon Byron. Asst. to Pres., Grand Trunk Western Ry., Detroit, Mich ..... May 5, 1886

Atwood, John Abiel. Chf. Engr., P. & L. E. R. R. Co., Pittsburg, Pa. ..... Jan. 3, 1900

Auchincloss, William S. Atlantic Highlands, N. J. ..... Feb. 17, 1869

Aus, Gunvald. Cons. Engr., 79 Wall St., New York City ..... April 3, 1895

Austin, William Eugene. Archt., 7 Wall St., New York City ..... Dec. 7, 1904

Averill, Frank Lloyd. Structural Engr., U. S. House of Representatives Office Bldg.; Address, 220 Colorado Bldg., Washington, D. C. ..... Assoc. M. Jan. 6, 1897; M. May 6, 1903

Axtell, Decatur. Vice-Pres., C. & O. Ry. Co., Richmond, Va. ..... Mar. 3, 1886

Aycrigg, William Anderson. Civ. Engr., with U. P. R. R., 201 South 33d St., Omaha, Nebr ..... Assoc. M. May 4, 1892; M. May 4, 1898

Ayres, Henry Wilcox. 66 State St., Hartford, Conn. ..... Mar. 5, 1890

Babb, Cyrus Cates. Engr., U. S. Geological Survey, Washington, D. C. ..... Jun. Feb. 2, 1892; Assoc. M. Feb. 3, 1897; M. Mar. 1, 1904

Babcock, Henry Nash. U. S. Asst. Engr., Army Bldg., 39 Whitehall St., New York City ..... Sept. 3, 1884

Bacon, James Hayward. Harbor Engr., Grand Trunk Pacific Ry., P. O. Box 516, Port Arthur, Ont., Canada ..... Jan. 3, 1900

Bacon, John Watson. Danbury, Conn. ..... July 12, 1877

Bacot, William Sinclair. Engr. and Gen. Mgr., Consolidated Water Co. of Utica, 234 Genesee St., Utica, N. Y. ..... Oct. 1, 1890

N. Baier, Julius. Mgr., Conrey Placer Min. Co., Ruby, Mont. ..... Jun. Sept. 7, 1887; Assoc. M. June 1, 1892; M. Feb. 6, 1901

Bailey, George Irving. Cons. Engr. and Contr., 1199 Fulton Ave., New York City ..... Oct. 1, 1890

Baird, Howard Carter Res. Engr. (Boller & Hodge), Room 46, Franklin Trust Bldg., Brooklyn, N. Y. .... Jun. Jun. 6, 1893; Assoc. M. Oct. 5, 1898; M. Feb. 2, 1904

Baker, Charles Hinckley. Chf. Engr., Seattle-Tacoma Power Co., Seattle, Was. ..... June 4, 1902

Baker, Holland Williams. Kirkwood, Mo. ..... May 7, 1890

Baker, Ira Osborn. 702 W. University Ave., Champaign, Ill. .... May 3, 1893

Baker, William Edgar. 27 William St., New York City ..... June 1, 1898

Date of Membership.

BALBIN, ERNESTO JOAQUIN. Chf. Engr. of the Light House Service of Cuba (Res., Calle 13, No. 21, Ve lado), Havana, Cuba ..... Nov. 1, 1893

BALDWIN, FRED HIXON. Supt., Bergenport Chemical Works, P. O. Box 63, Bayonne, N. J..... Nov. 5, 1884

BALDWIN, HENRY FURLONG. In Chg. of the Manufacture of Smokeless Powder for E. J. du Pont Co., 1500 Rodney St., Wilmington, Del. ..... Assoc. M. Dec. 7, 1892; M. Feb. 6, 1895

BALDWIN, THOMAS WILLIAMS. Boothbay Harbor, Me..... April 2, 1884

BALDWIN, WARD. Cons. Engr., 65 Mitchell Bldg., Cincinnati, Ohio..... Jun. Mar. 2, 1881; M. Oct. 2, 1889

BALDWIN, WILLIAM HENRY. Warburton Bldg., Yonkers, N. Y..... June 6, 1888

BALDWIN, WILLIAM JAMES. Cons., Heating and Ventilating Engr., 107 West 17th St., New York City ..... Sept. 5, 1888

BALL, CHARLES BACKUS. 118 Hazel Ave., Chicago, Ill..... Oct. 1, 1890

BALLARD, ROBERT. 35 Wood Lane, Shepherd's Bush, London, W., England..... Sept. 1, 1880

BARBER, WILLIAM DAVIS. Asst. Engr. in Chg., Div. of Constr. and Repairs, 323 City Hall, Chicago, Ill.... Assoc. M. Sept. 1, 1897; M. Jan. 8, 1902

BARBOUR, FRANK ALEXANDER. (Snow & Barbour, Civ. and San. Engrs.), 1120 Tremont Bldg., Boston, Mass..... Sept. 5, 1900

BARCROFT, FREDERICK THOMAS. Cons. Engr. and Archt. (Joy & Barcroft), 407 Ferguson Bldg., Detroit, Mich..... Sept. 3, 1902

BARDOL, FRANK VALENTINE ERHARD. Engr. and Contr., 400 D. S. Morgan Bldg., Buffalo, N. Y..... May 2, 1900

BARLOW, JOHN QUINCY. Chf. Engr., West. Md. R. R., Central Station, Cumberland, Md..... Jun. April 7, 1886; M. July 4, 1888

BARNARD, EDWARD CHESTER. Chf. Topographer, U. S. and Canada Boundary Survey, Washington, D. C..... Dec. 3, 1902

BARNARD, JOHN FISKE. Pres., St. Clair, Madison & St. L. Belt R. R. Co., St. Joseph, Mo ..... Sept. 1, 1880

BARNES, MORTIMER GRANT. U. S. Asst. Engr., Geneseo, Ill..... Assoc. M. Nov. 2, 1898; M. May 31, 1904

BARNES, OLIVER WELDON. Cons. Engr., Fishkill, Dutchess Co., N. Y. July 6, 1881

BARNES, THOMAS HOWARD. Civ. and Municipal Engr., San Jose, Costa Rica..... Oct. 4, 1899

BASSEL, ROBERT. Regierungs und Bau Rat, Lobauer Strasse 10, Deutsch-Eylau, Germany..... May 2, 1888

BASSELL, BURR. Cons. Civ. Engr., Room 416, Douglas Bldg., Los Angeles, Cal ..... Nov. 4, 1903

BASSETT, CARROLL PHILLIPS. Treas., Commonwealth Water & Light Co.; Cons. Hydr. Engr., Summit, N. J..... Nov. 7, 1888

BASSETT, GEORGE BARCLAY. Pres. and Gen. Mgr., Buffalo Meter Co., Buffalo, N. Y..... Mar. 1, 1893

BATES, ONWARD. Pres., Bates & Rogers Constr. Co., 1205 Manhattan Bldg. (Res , 320 Belden Ave.), Chicago, Ill..... Jan. 4, 1882

BAXTER, FRANK EDWIN. Div. Engr., D. & R. G. R. R. Co., 1250 Brigham St., Salt Lake City, Utah..... Oct. 2, 1901

Date of Membership.

BAXTER, GEORGE STRONG. Railroad and lumber business, 15 William St., New York City ..... Jun. May 12, 1875; M. May 3, 1876

BAYLISS, RAWLINSON TENNANT. 11 Cornhill, London, E. C., England. June 4, 1890

BEACH, ROBERT JAMES. Pres., R. J. Beach Eng. Co., 32 Broadway, New York City ..... May 2, 1900

BEAHAN, WILLARD. Div. Engr., C. & N. W. Ry., Winona, Minn ..... April 3, 1889

BEARD, EDWARD JAMES. Prin. Asst. Engr., C., R. I. & P. Ry., 803 La Salle Station, Chicago, Ill. (Res., 3838 McGee St., Kansas City, Mo.) ..... Feb. 7, 1900

BEARDSLEY, ARTHUR. Emeritus Prof. of Eng., Swarthmore Coll., Swarthmore, Pa ..... Assoc. Sept. 1, 1875; M. Sept. 2, 1891

BEARDSLEY, JAMES WALLACE. Cons. Engr. to the Comm., Manila, Philippine Islands ..... Dec. 4, 1901

BECKLER, ELBRIDGE HARLOW. Director in Winston Bros. Co., 1838 Aldine Ave., Chicago, Ill ..... April 6, 1892

BECKWITH, FRANK. Prin. Asst. Engr., L. S. & M. S. Ry., Cleveland, Ohio ..... Nov. 7, 1900

BELKNAP, WILLIAM ETHELBERT. Supt., Communipau Coal Co., Jersey City, N. J.; Address, 17 Battery Pl., New York City ..... Jun. Mar. 31, 1891; Assoc. M. Mar. 6, 1895; M. Dec. 1, 1897

BELL, ALONZO CLARENCE. 920 Hibernia Bank Bldg., New Orleans, La. Mar. 7, 1900

BELL, ANDREW. Cons. Engr., Almonte, Ont., Canada ..... Sept. 5, 1883

BELL, GEORGE JOSEPH. County Surv. and Bridge Master, The Courts (also 16 Portland Sq.), Carlisle, England. Assoc. M. Nov. 2, 1898; M. Oct. 1, 1902

BELL, GILBERT JAMES. Asst. Engr., A., T. & S. F. Ry., 1222 East Tenth St., Kansas City, Mo ..... Jun. Sept. 7, 1887; M. Oct. 6, 1897

BELL, HENRY PURDON. Victoria, B. C., Canada ..... June 4, 1884

BELL, JAMES RICHARD. 47 Victoria St., Westminster, London, S. W., England ..... Sept. 2, 1896

BELLINGER, LYLE FREDERICK. Civ. Engr., U. S. N., Civ. Engr. in Chg., U. S. Naval Station, New Orleans, La ..... Nov. 6, 1901

BEMENT, ROBERT BUNKER COLEMAN. Contr. and Cons. Engr., 506 Endicott Bldg., St. Paul, Minn ..... Sept. 7, 1887

BENNETT, FREDERICK WAGONER. 1 Madison Ave., Room 5060, New York City ..... Oct. 7, 1903

BENSEL, JOHN ANDERSON. Engr. in Chf., Dept. of Docks and Ferries, New York City ..... Jun. Sept. 2, 1885; M. Mar. 4, 1891

BENSON, ORVILLE. Engr., Am. Bridge Co., Ambridge, Pa ..... June 5, 1901

BENT, CORNELIUS CONWAY FELTON. Care, B. & O. R. R. Co., 24th and Chestnut Sts., Philadelphia, Pa ..... May 1, 1889

BENZENBERG, GEORGE HENRY. Cons. Engr., 310 Wells Bldg., Milwaukee, Wis ..... May 2, 1883

BERG, LOUIS DE COPPET. Archt., 6 West 22d St., New York City ..... Assoc. June 6, 1888; M. Sept. 2, 1891

BERG, WALTER GILMAN. Chf. Engr., Lehigh Val. R. R. (Res., 261 West 52d St.), New York City ..... Feb. 5, 1896

BERGEN, VAN BRUNT. Shore Road and 77th St., Brooklyn, N. Y ..... June 17, 1868

Date of Membership.

BEELE, KORT. Chf. Structural Engr., Office of the Superv. Archt., Treasury Dept., Washington (Res., Brookland), D. C ..... Assoc. M. Dec. 6, 1899; M. Nov. 4, 1903

BEERIAN, RICHARD MILFORD. Post Office Bldg., New Rochelle, N. Y.. May 4, 1887

BETTS, FRED KEELER. Asst. Engr., Dept. of Water Supply, Gas and Electricity, New York City, in Chg. of San. Patrol of the Croton, Bronx and Byram Watersheds, Katonah, N. Y..... May 4, 1898

BEUGLER, EDWIN JAMES. Res. Engr., Boston Terminal Co., 220 South Station, Boston, Mass..... Jun. June 19, 1891; Assoc. M. Feb. 1, 1899; M. Jan. 5, 1904

BIDDLE, JOHN. Maj., Corps of Engrs., U. S. A., Washington, D. C. July 4, 1894

BIDDLE, WILLIAM FOSTER. 209 South 3d St., Philadelphia, Pa..... June 4, 1884

BIENENFELD, BERNARD. Cons. Engr., 2158 Pine St., San Francisco, Cal. May 6, 1903

BIGELOW, EDWARD MANNING. Pittsburg, Pa..... Dec. 4, 1889

BILLIN, CHARLES EMERY. Propr., Am. Eng. Works, 480 N. State St., Chicago, Ill..... Jun. April 5, 1876; M. July 3, 1878

BINKLEY, GEORGE HOLLAND. The Hadley Derrick Co., 33 Talbott Blk., Indianapolis, Ind..... Oct. 1, 1902

BISBEE, FRED MILTON. Engr., Western Grand Div., A., T. & S. F. Ry., La Junta, Colo..... May 3, 1899

BISHOP, GEORGE H. 129 Main St., Middletown, Conn.. ..... Aug. 7, 1872

BISHOP, HUBERT KEENEY. Chf. Engr., construction of New Water-Works, Hudson, N. Y..... Oct. 5, 1904

BISSELL, FRANK EDWARD. First Asst. Engr., L. S. & M. S. Ry., Cleveland, Ohio ..... Jun. April 2, 1884; M. Sept. 2, 1891

BISSELL, HEZEKIAH. (*Director*). Chf. Engr., B. & M. R. R., Boston, Mass..... Sept. 15, 1869

BIXBY, WILLIAM HERBERT. Col., Corps of Engrs., U. S. A., 246 Belvidere Ave., Detroit, Mich..... April 5, 1882

R. BLACK, WILLIAM MURRAY. Maj., Corps of Engrs., U. S. A., U. S. Engr. Office, Portland, Me..... June 6, 1888

BLACKFORD, FRANCIS WEBSTER. 92 East 8th Ave., Columbus, Ohio .. April 4, 1888

BLACKWELL, CHARLES. Wabash R. R., 911 Lincoln Trust Bldg., St. Louis, Mo ..... Sept. 7, 1881

BLACKWELL, FRANCIS OGDEN. Cons. Engr., 49 Wall St., New York City ..... Oct. 5, 1904

BLAISDELL, ANTHONY HOUGHTALING. Civ. and Mech. Engr., Coeymans, Albany Co., N. Y..... Mar. 3, 1880

BLAKELEY, GEORGE HENRY. Chf. Engr., Passaic Steel Co., Paterson, N. J ..... Jun. Dec. 4, 1889; M. Oct. 2, 1895

BLAKESLEE, CLARENCE. Civ. Engr. and Contr. (C. W. Blakeslee & Sons), 58 Waverly St. (Res., 598 George St.), New Haven, Conn..... June 4, 1895

BLAND, GEORGE PIERREPONT. 510 Harrison Bldg., Philadelphia, Pa..... Jun. April 7, 1875; M. May 4, 1881

BLAND, JOHN CARLISLE. Engr. of Bridges, Penn. Lines W. of Pitts., Union Station, Pittsburg, Pa..... Jun. May 12, 1875; M. June 4, 1879

BLODGETT, ALBERT MORRILL. Civ. Engr. and Bridge Contr., 405 Thayer Bldg., Kansas City, Mo..... Sept. 7, 1904

Date of Membership.

BLOSS, RICHARD PARKHURST. Res. Engr., West Virginia Pulp & Paper Co., Mechanicsville, N. Y.. ..... Jan. 6, 1904

BLUNT, WILLIAM TITCOMB. U. S. Asst. Engr., P. O. Box 142, Toledo, Ohio..... Oct. 5, 1898

BODY, JOHN BENJAMIN. Puente de Alvarado 15, City of Mexico, Mexico..... Assoc. M. Oct. 2, 1895; M. May 2, 1900

BOGART, JOHN. Cons. Engr., 16 Exchange Pl., New York City ..... Feb. 17, 1869

BOGGS, EDWARD MARSHALL. Chf. Civ. Engr., Oakland Traction Consolidated, Oakland, Cal..... June 6, 1900

BOGUE, VIRGIL GAY. 15 William St., New York City..... Sept. 15, 1869

BOLLER, ALFRED PANCOAST. Cons. Engr. (Boller & Hodge), 1 Nassau St., New York City..... Dec. 4, 1867

BOLTON, CHANNING MOORE. Cons. Engr., Rio, Albemarle Co., Va..... Jan. 4, 1888

BOLTON, REGINALD PELHAM. Cons. Engr., 35 Nassau St., New York City..... Sept. 6, 1899

BOND, EDWARD AUSTIN. State Hall, Albany, N. Y..... Sept. 6, 1899

BOND, GEORGE MEADE. 141 Washington St., Hartford, Conn..... Feb. 2, 1887

BONNETT, WILLIAM WHITLOCK. Waterbury, Conn ..... Sept. 4, 1872

BONTECOU, DANIEL. Cons. Engr., Postal Telegraph Bldg., Kansas City, Mo..... Nov. 5, 1879

BONZANO, ADOLPHUS. Pres., Bonzano Rail Joint Co., 331 South 18th St., Philadelphia, Pa..... Aug. 7, 1872

BONZANO, MAXIMILIAN FERDINAND. 331 South 18th St., Philadelphia, Pa..... Jan. 6, 1886

BOOTH, WILLIAM HENRY. 2 Queen Anne's Gate, Westminster, London, S. W., England..... July 4, 1888

BOSLER, HARRY SHERMAN. Gen. Supt., M. T. Lewman & Co., Contrs., Locks 1, 2 and 3, Warrior and Tombigbee Rivers, Demopolis, Ala ..... Feb. 4, 1903

BOTH, CARL CHRISTIAN ADOLPH. U. S. Asst. Engr., U. S. Engr. Office, Portland, Me..... Sept. 2, 1891

BOTT, JOHN B. Engr., P. R. R., 317 So. Main St., Greensburg, Pa.... Oct. 1, 1890

BOWERS, GEORGE. City Engr., City Hall, Lowell, Mass..... Oct. 1, 1902

BOWIE, AUGUSTUS JESSE. Cons. Engr., 217 Sansome St., San Francisco, Cal..... Nov. 1, 1882

BOWKER, WILLARD LEWIS. Walpole, Mass. ..... June 3, 1903

BOWMAN, AUSTIN LORD. (*Director*). Civ. and Cons. Engr., 29 Broadway, Room 174, New York City. .... Assoc. M. Sept. 7, 1892; M. Dec. 1, 1897

BOWSER, EDMUND HAMILTON. Asst. Engr., L. & N. R. R., 243 Sixth St., Louisville, Ky..... June 1, 1904

BOYNTON, GEORGE HERBERT. Pres., Gen. Constr. Co., McManus Bldg., Davenport, Iowa..... Sept. 3, 1884

BRACE, JAMES HENRY. Engr. of Alignment, East River Div., P., N. Y. & L. I. R. R., 345 East 33d St., New York City. ..... Assoc. M. Jan. 2, 1901; M. Sept. 6, 1904

BRACKENRIDGE, JOHN CROSBIE. Commr. of Public Works, Borough of Brooklyn, City of New York (Res., 150 Hicks St.), Brooklyn, N. Y..... May 5, 1897

Date of Membership.

BRACKENRIDGE, WILLIAM ALGERNON. Cons. Engr.; Mem. of Advisory Board of Cons. Engrs. for Impvt. of State Canals, Niagara Falls, N. Y. ..... June 2, 1886

BRACKETT, DEXTER. Engr., Distrib. Dept., Met. Water-Works, 1 Ashburton Pl., Boston, Mass. ..... June 6, 1888

BRADFORD, WILLIAM. Mgr., Pittsburg Office, Westinghouse, Church, Kerr & Co., Westinghouse Bldg., Pittsburg, Pa. ..... Dec. 7, 1898

BRADLEY, DANIEL EDWARD. Berlin, Conn. ..... May 1, 1895

BRADLEY, WILLIAM HAMMATT. 53 State St., Boston, Mass. ..... Feb. 5, 1879

BRADY, SAMUEL DUNLAP. Chf. Engr., The Little Kanawha R. R. Co., Parkersburg, W. Va. ..... Sept. 7, 1904

BRAMWELL, GEORGE WASHINGTON. Cons. Engr., 335 Broadway, New York City ..... Mar. 1, 1893

BRECKINRIDGE, CABELL. Cons. Civ. Engr., 210 E. Lexington St., Danville, Ky. ..... June 1, 1881

BRECKINRIDGE, WILLIAM LEWIS. Engr., Lines East of Missouri River, C., B. & Q. Ry., Chicago, Ill. ..... Oct. 7, 1903

BREEN, HOWARD. 275 S. Euclid St., Pasadena, Cal. ..... April 4, 1888

R. BREITHAUPT, WILLIAM HENRY. Cons. Engr., Berlin, Ont., Canada ..... Jun. June 4, 1884; M. July 6, 1887

BREMNER, GEORGE HAMPTON. Engr., M. of W. Illinois Dist, C., B. & Q. Ry., Chicago, Ill. ..... Dec. 6, 1899

BRENDLINGER, PETER FRANKLIN. Civ. Engr. and Contr., 1009 Arcade Bldg., Philadelphia, Pa. ..... Sept. 7, 1887

BREUCHAUD, JULES. Engr. and Contr., Croton Dam Contract, Croton-on-Hudson (Res., Park Hill, Yonkers), N. Y. ..... Assoc. June 5, 1889; M. Oct. 5, 1898

BRIGGS, JOSIAH ACKERMAN. Chf. Engr. in and for the Borough of the Bronx, New York City. ..... Sept. 1, 1886

BRIGGS, ROSWELL EMMONS. Apartado 561, City of Mexico, Mexico. ... Sept. 15, 1869

BRINCKERHOFF, ALEXANDER GORDON. Supt. of Works, Johnson & Morris, 30 West 13th St., New York City. ..... Nov. 3, 1886

BRINCKERHOFF, HENRY WALLER. Cons. Engr., 45 Broadway, New York City. ..... Nov. 7, 1883

BRINSMADE, DANIEL SEYMOUR. Pres., The Ousatonic Water Co., Derby, Conn. ..... Feb. 1, 1888

BRODHEAD, CALVIN EASTON. People's Bank Bldg., Wilkesbarre, Pa. ... Feb. 21, 1872

BROOKS, FREDERICK. 31 Milk St., Boston, Mass. ..... Jun. June 7, 1876; M. Jan. 2, 1884

BROWN, ALBA FISK. Seventh St., Oakmont, Allegheny Co., Pa. ..... Sept. 7, 1887

BROWN, BAXTER LAMONT. 157 Laclede Bldg., St. Louis, Mo. ..... April 1, 1903

BROWN, CHARLES CARROLL. Cons. Engr.; Editor, *Municipal Engineering Magazine*, 410 Commercial Club Bldg., Indianapolis, Ind. ... Oct. 2, 1895

BROWN, CHARLES OTTO. Cons. Engr., 1 Madison Ave., New York City ..... Jun. Jan. 6, 1875; M. Nov. 7, 1877

BROWN, EDWARD DU BOIS. 1632 Irving Park Boulevard, Chicago, Ill. June 3, 1903

BROWN, LE GRAND. Cons. Engr., 16 State St., Rochester, N. Y. ..... May 4, 1898

BROWN, LINUS WEED. 4901 Camys St., New Orleans, La. ..... June 7, 1899

Date of Membership.

BROWN, RALPH HENRY. Chf. Engr., Eastern Bridge & Structural Co., Station A, Worcester, Mass. — June 7, 1899

BROWN, THOMAS ELLIS. Cons. Engr., Otis Elevator Co., 17 Battery Pl., New York City. — Jun. Nov. 3, 1880; M. April 2, 1884

BROWN, WENDELL PHILLIPS. Eastern Representative, The King Bridge Co., 277 Broadway, New York City... — Assoc. M. Oct. 2, 1895; M. Mar. 5, 1902

BROWN, WILLIAM MAXWELL. Engr., Sewerage Works, Met. Water and Sewerage Board, 1 Ashburton Pl., Boston, Mass. — Feb. 5, 1896

BROWNE, GEORGE HAMILTON. Hawkwood, Zion, Louisa Co., Va. — Sept. 3, 1884

BROWNE, WILLIAM ROBERT. 413 Fourth Ave., Room 502, Pittsburg, Pa. — June 1, 1898

BROWNELL, ERNEST HENRY. Civ. Engr., U. S. N., Navy Yard, Portsmouth, N. H. — Assoc. M. Jan. 1, 1896; M. Jan. 5, 1904

BROWNLEE, JAMES LEEMAN. Cons. Engr., 29 Broadway, Room 174, New York City. — May 6, 1896

BRUCE, FRED WILLIAM. U. S. Asst. Engr., Mayport, Fla. — April 4, 1900

BRUNNER, JOHN. Asst. Gen. Supt., North Works, Ill. Steel Co., 50 Wabansia Ave., Chicago (Res., 1732 Chicago Ave., Evanston), Ill. — Mar. 2, 1898

BRYAN, CHARLES WALTER. Div. Contr. Mgr., Am. Bridge Co. of N. Y., 100 Broadway, New York City. — June 3, 1903

BRYSON, ANDREW. Pres., Brylgon Steel Casting Co., New Castle, Del. — April 1, 1885

BUCHANAN, EDWARD EVERETT. Cons. Bridge Engr., Elmira, N. Y. — Dec. 4, 1889

BUCHHOLZ, CARL WALDEMAR. Cons. Engr., Erie R. R., 26 Cortlandt St., New York City. — Sept. 1, 1886

N. BUCK, LEFFERT LEFFERTS. Cons. Engr., Hastings on Hudson, N. Y. — Feb. 3, 1875

R. BUCK, RICHARD SUTTON. Cons. Engr., Dept. of Bridges, Park Row Bldg., New York City. — Assoc. M. April 5, 1893; M. Mar. 2, 1898

BUCK, WALDO EMERSON. Pres. and Treas., Worcester Mfrs. Mutual Insurance Co., 53 William St., Worcester, Mass. — July 3, 1889

BUDGE, EDWARD BARNARD. Engr. in Chf., 1st Section, Chili State Rys., Bella Vista Station, Valparaiso, Chili. — Nov. 6, 1901

BUDGE, ENRIQUE. Valparaiso, Chili. — Feb. 1, 1882

BULLOCK, WILLIAM DEXTER. Asst. Engr. in Chg., Bridge and Harbor, City Engr.'s Office, Providence, R. I. — Jun. Sept. 5, 1887; M. July 4, 1888

BURBANK, GEORGE BARKER. White Plains, N. Y. — July 4, 1888

BURDEN, JAMES. Asst. Engr., N. Y. State Barge Canal, 3 Locust Ave., Troy, N. Y. — Assoc. M. Feb. 5, 1902; M. Jan. 5, 1904

BURDEN, JAMES A. Woodside, Troy, N. Y. — July 2, 1879

BURDETT, FREDERICK ANDERSON. Cons. Engr., 3 East 33d St., New York City. — Jun. Feb. 2, 1897; Assoc. M. June 1, 1898; M. Oct. 7, 1903

BURKE, MILO DARWIN. N. E. cor. Fourth and Walnut Sts., Cincinnati, Ohio. — July 4, 1894

BURNS, CLINTON SUMNER. Civ., Hydr. and San. Engr. (Burns & McDonnell), 509 Dwight Bldg., Kansas City, Mo. — Assoc. M. Feb. 1, 1899; M. Jan. 3, 1905

BURNS, EDWARD COOK. 417 Spring St., Jamestown, N. Y. — July 5, 1882

Date of Membership.

BURNS, ROBERT BRUCE. Chf. Engr., A., T. & S. F. Ry. Co., 2642 Vermont Ave., Los Angeles, Cal. ..... Sept. 5, 1900

BURPEE, MOSES. Chf. Engr., Bangor & Aroostook R. R., Houlton, Me ..... Sept. 3, 1884

BURR, EDWARD. Maj., Corps of Engrs., U. S. A., Washington Barracks, Washington, D. C. ..... May 6, 1891

R. BURR, WILLIAM HUBERT. Prof. of Civ. Eng., Columbia Univ.; Cons. Engr., 151 West 74th St., New York City ..... Jun. June 3, 1874; Assoc. May 5, 1880; M. Mar. 3, 1886

BURROWES, FRANCIS SMITH. U. S. Asst. Engr., U. S. Engr.'s Office, Portland, Me. ..... June 6, 1888

BURTON, ALFRED EDGAR. Dean and Prof. of Topographical Eng., Mass. Inst. Tech., Boston, Mass ..... Sept. 4, 1901

BUSH, HARRY DEAN. Mgr., Baltimore Bridge Co., Baltimore, Md. ... May 2, 1888

BUTLER, MATTHEW JOSEPH. Asst. Chf. Engr., The Commrs. of The Transcontinental Ry., Ottawa, Ont., Canada ..... April 1, 1885

BUTTERFIELD, FRANCIS EAVES. Culiacan, Sinaloa, Mexico ..... Sept. 1, 1886

BUTTS, EDWARD PONTANY. Chf. Engr., Am. Writing Paper Co., Holyoke (Res., Springfield), Mass. ..... Assoc. M. Feb. 2, 1898; M. Oct. 7, 1903

BUXTON, CLIFFORD. Chf. Engr., T. & O. C. and K. & M. Rys., Toledo, Ohio ..... May 6, 1885

C. BYERS, MORTON LEWIS. Engr., M. of W., Mo. Pac. Ry. System, St. Louis, Mo. ..... Jun. Jan. 2, 1890; M. Sept. 7, 1898

BYLLESBY, HENRY MANSON. Pres., H. M. Byllesby & Co., Engrs., 422 New York Life Bldg., Chicago, Ill ..... June 1, 1887

CAIN, WILLIAM. Univ. of North Carolina, Chapel Hill, N. C. ..... Nov. 7, 1888

CAIRNS, ROBERT ANDREW. City Engr., Waterbury, Conn ..... Oct. 2, 1895

CALKINS, FRANK AUGUSTUS. Edgewater, Colo. ..... April 5, 1882

CAMP, WALTER MASON. Editor, *Railway Review*, 7418 Parnell Ave., Chicago, Ill. ..... May 1, 1901

CAMPBELL, HARRY HUSE. Gen. Mgr., The Pennsylvania Steel Co., Steelton, Pa. ..... June 6, 1894

CAMPBELL, JOHN LOGAN. Locating Engr., El Paso & Southwestern R. R., 917 E. Rio Grande St., El Paso, Tex. ..... May 1, 1901

CANFIELD, EDWARD. Gen. Supt., N. Y., O. & W. Ry. Co., Middletown, N. Y ..... Dec. 3, 1879

CAPLES, MARTIN JOSEPH. Supt., Pocahontas Div., N. & W. Ry., Bluefield, W. Va. ..... Assoc. M. Nov. 4, 1891; M. Oct. 4, 1899

CAPPELEN, FREDERICK WILLIAM. Cons. Engr., 610 Globe Bldg., Minneapolis, Minn. ..... April 3, 1895

CARLL, DAVID SYLVANUS. Chf. Engr., Capital Traction Co., Washington, D. C. ..... Jun. Mar. 7, 1888; Assoc. M. July 1, 1891; M. Oct. 7, 1896

CAROTHERS, DANIEL DAWSON. Chf. Engr., B. & O. R. R., Baltimore, Md. ..... April 4, 1894

CARPENTER, GEORGE ANSEL. City Engr., Pawtucket, R. I. ..... May 7, 1902

		Date of Membership.
CARR, ALBERT. Engr., First Div., Rapid Transit Comm., 122 Liberty St., New York City (Res., 68 Carnegie Ave., East Orange, N. J.)	Assoc. M.	Mar. 2, 1892
	M.	Oct. 7, 1903
CARR, WALTER FRANK. Chf. Engr., The Falk Co., Milwaukee, Wis.		June 6, 1894
CARROLL, EUGENE. Chf. Engr. and Supt., Butte Water Co., Butte, Mont	Jun.	Jan. 4, 1888
	Assoc. M.	July 1, 1891
	M.	June 2, 1897
CARSON, HOWARD ADAMS. Chf. Engr., Boston Transit Comm., 15 Beacon St., Boston, Mass		Feb. 7, 1894
CARSON, WILLIAM WALLER. Prof. of Civ. Eng., Univ. of Tennessee; Address, 1705 Clinch Ave., Knoxville, Tenn		Nov. 2, 1892
CARTER, EDWARD CARLOS. Chf. Engr., C. & N. W. Ry., Chicago, Ill.		April 4, 1888
CARTER, HENRY HALL. Pres., Met. Contr. Co., 95 Milk St., Boston, Mass		May 7, 1890
CARTER, J. RIVERS. Birmingham, Ala		Feb. 3, 1892
CARTER, WILLIAM J. City Engr., 2042 Woodland Hills Ave., Cleveland, Ohio	Jun.	Feb. 5, 1895
	Assoc. M.	Sept. 7, 1898
	M.	Nov. 1, 1904
CARTLIDGE, CHARLES HOPKINS. Bridge Engr., C., B. & Q. R. R., 209 Adams St., Room 61, Chicago, Ill		May 4, 1904
CARTWRIGHT, ROBERT. Cons. Engr., 6 Berkeley St., Rochester, N. Y.		July 10, 1872
CARY, EDWARD RICHARD. Prof. of R. R. Eng. and Geodesy, Rensselaer Polytechnic Inst., Troy, N. Y.		April 2, 1902
CASE, JAMES FRANCIS. City Engr., Manila, Philippine Islands		Jan. 6, 1904
CATT, GEORGE WILLIAM. Pres. and Chf. Engr., Atlantic, Gulf & Pacific Co.; Cons. Engr., San Francisco Bridge Co. and Puget Sound Bridge & Dredging Co., Seattle. Park Row Bldg., New York City.		Sept. 7, 1892
CATTELL, WILLIAM ASHBURNER. Cons. Engr., Park Row Bldg., New York City	Assoc. M.	May 6, 1891
	M.	Oct. 7, 1896
CHAMBERLAIN, PHILLIP WILLIAM. Cons. Engr., Dept. of Public Works of Nicaragua, Greytown, Nicaragua		Oct. 2, 1895
CHAMBERLIN, CHESTER HARVEY. Div. Engr., Tex. & Pac. Ry., Boyce, La		Oct. 5, 1904
CHAMBERS, FRANK TAYLOR. Civ. Engr., U. S. N., Navy Dept., Washington, D. C	Assoc. M.	April 6, 1898
	M.	Mar. 3, 1903
CHAMBERS, RALPH HAMILTON. (Chambers & Hone), 60 New St., New York City	Assoc. M.	Dec. 1, 1897
	M.	April 5, 1904
R. CHANUTE, OCTAVE. (*Past-President*). Cons. Engr., 413 East Huron St., Chicago, Ill	M.	Feb. 19, 1868
	F.	July 11, 1872
CHAPIN, LOOMIS EATON. Civ. and Cons. Engr., Central Savings Bank Bldg., Canton, Ohio	Jun.	Dec. 3, 1884
	Assoc. M.	Sept. 7, 1892
	M.	Nov. 4, 1896
CHAPMAN, JAMES RUSSELL. Gen. Mgr. and Chf. Engr., Underground Elec. Ry. Co. of Lond., Ltd., Hamilton House, Victoria Embankment, London, E. C., England		Mar. 6, 1901
CHAPPELL, THOMAS FENNING. Cons. Engr., 45 Broadway, New York City		Oct. 5, 1904

Date of Membership.

CHASE, CHARLES FRANCIS. Civ. and Cons. Engr., 75 Westminster St., Providence, R. I. — Jan. 1, 1896

CHASE, CHARLES FRANCIS. Chf. Engr., Berlin Constr. Co., Berlin (Res., 241 West Main St., New Britain), Conn. — Feb. 5, 1902

CHASE, FRANK LYNTON. Pres., Jamestown, Chautauqua & Lake Erie Ry.; Pres., Chautauqua Steamboat Co., Jamestown, N. Y. — Assoc. M. Nov. 4, 1896; M. Nov. 1, 1899

CHASE, JOHN CARROLL. Chf. Engr. of Water Cos., Derry, N. H. — Mar. 1, 1893

CHASE, WILLIAM BEVERLY. 667 Worcester Bldg., Portland, Ore. — Sept. 6, 1899

CHEEVER, ALBERT SAFFORD. Supt., Fitchburg Div., B. & M. R. R., Boston, Mass. — June 7, 1893

CHENEY, JOHN EUGENE. Asst. City Engr., 50 City Hall, Boston, Mass. — May 7, 1884

CHESTER, JOHN NEEDELS. Chf. Engr., Am. Water-Works & Guarantee Co., 1200 Bank for Savings Bldg., Pittsburg, Pa. — Jun. Dec. 6, 1892; Assoc. M. Dec. 5, 1894; M. Mar. 6, 1901

CHIBAS, EDUARDO JUSTO. Cons. Engr. and Contr., Apartado 110, Santiago de Cuba, Cuba. — Jun. Mar. 31, 1891; Assoc. M. May 6, 1896; M. Jan. 3, 1900

CHILD, STEPHEN. Landscape Archt. and Cons. Engr., 2A Park St., Boston, Mass. — Oct. 5, 1898

CHILDS, JAMES EDMUND. Vice-Pres. and Gen Mgr., N. Y., O. & W. Ry. Co., 56 Beaver St., New York City. — Dec. 4, 1878

CHILDS, OLIVER W. Chf. Engr., Stupp Bros. Bridge & Iron Co., 304 Frisco Bldg., St. Louis, Mo. — Assoc. M. Sept. 5, 1900; M. Sept. 3, 1902

CHIPMAN, WILLIS. 103 Bay St., Toronto, Ont., Canada — June 6, 1888

CHITTENDEN, HIRAM MARTIN. Maj., Corps of Engrs., U. S. A., Sioux City, Iowa. — Feb. 7, 1900

CHRISTIE, GEORGE B. (Christie & Lowe, Civ. Engrs. and Contrs.), 171 La Salle St., Chicago, Ill. — Oct. 2, 1895

N. CHRISTIE, JAMES. 100 Rochelle Ave., Wissahickon, Philadelphia, Pa. — May 7, 1873

CHRISTY, GEORGE LEWIS. 128 West 42d St., New York City. — Jun. June 6, 1893; Assoc. M. Nov. 4, 1896; M. Jan. 31, 1905

CHURCH, CHARLES TITUS. 155 William St., Geneva, N. Y. — May 1, 1889

CHURCH, GEORGE EARL. Dashwood House, 9 New Broad St., London, E. C., England. — Nov. 2, 1887

CHURCHILL, CHARLES SAMUEL. Chf. Engr., Norfolk & West. Ry., Roanoke, Va. — May 1, 1889

CHURCHILL, JOHN CHARLES, Jr. U. S. Asst. Engr., Oswego, N. Y. — Feb. 1, 1899

CLAPP, OTIS FRANCIS. City Engr., Providence, R. I. — Mar. 2, 1898

CLARK, CHARLES HENRY. Engr., M. of W., Cleveland Elec. Ry. Co., Cleveland, Ohio. — May 7, 1902

CLARK, GEORGE HUNTINGTON. Gen. Contr., 511 Woodward Bldg., Birmingham, Ala. — Mar. 5, 1890

CLARK, JOHN HOWARD. 45 Lincoln St., Malden, Mass. — Nov. 4, 1903

CLARKE, DAVID DEXTER. Engr., Water Dept., City Hall, Portland, Ore. — July 5, 1882

N. CLARKE, ELIOT CHANNING. 15 Brimmer St., Boston, Mass. — Sept. 4, 1878

Date of Membership.

CLARKE, ERNEST WILDER. Res. Engr., Water-Works and Sewers, Isthmian Canal Comm., Cristobal, Canal Zone, Panama ..... Jan. 4, 1905

CLARKE, GEORGE CALBRAITH. Res. Engr., Penn., N. Y. & L. I. R. R. Co., 225 West 33d St., New York City..... June 3, 1903

CLARKE, ST. JOHN. Bogota, N. J..... Jun. Sept. 5, 1888; M. June 1, 1904

CLARKSON, ROBERT COOKE. Cons. Engr., 710 Stephen Girard Bldg., Philadelphia, Pa..... Jun. Jan. 5, 1887; M. Jan. 2, 1901

CLAUSSEN, OSCAR. Cons. Engr., 514 National German Am. Bank Bldg., St. Paul, Minn..... Oct. 2, 1901

CLAYTON, ROBERT MORRIS. City Engr., Atlanta, Ga..... Mar. 4, 1896

CLEMENT, FRANK HUDSON. Engr. and Contr., Land Title Bldg., Philadelphia, Pa. (Res., 124 West 48th St., New York City).... Nov. 1, 1882

CODWISE, EDWARD BERTIE. City Engr., Kingston, Ulster Co., N. Y... Sept. 5, 1888

COE, DAVID. Chf. Engr., F. C. N. T., Rincon Antonio, Oaxaca, Mexico..... Sept. 7, 1904

COE, WILLIAM WATSON. Gen. Mgr., Pocahontas Coal & Coke Co., Roanoke, Va..... April 3, 1889

COFFIN, AMORY. 33 East 17th St., New York City..... Mar. 3, 1875

COFFIN, FREEMAN CLARKE. Civ. and Hydr. Engr., 53 State St., Boston, Mass..... Feb. 6, 1895

COFFIN, THOMAS AMORY. Engr. and Contr., 45 Broadway, New York City..... Jun. Oct. 2, 1894; M. Feb. 1, 1899

COGSWELL, WILLIAM BROWN. Vice-Pres. and Managing Director, Solvay Process Co., Syracuse, N. Y ..... Assoc. Feb. 15, 1871; M. Oct. 16, 1872

COHEN, FREDERICK WILLIAM. Engr. of Erection, Bridge and Constr. Dept., The Pennsylvania Steel Co., Steelton, Pa..... Assoc. M. Feb. 3, 1897; M. Sept. 3, 1902

COHEN, MENDES. (*Past-President*). 825 North Charles St., Baltimore, Md..... Dec. 4, 1867

COLBY, ALBERT LADD. Asst. to Pres., International Nickel Co., 43 Exchange Pl., New York City..... Oct. 7, 1903

COLBY, BRANCH HARRIS. Civ. and Cons. Engr., 812 Security Bldg., St. Louis, Mo..... June 5, 1895

COLE, HOWARD JUDSON. 29 Broadway, New York City.... Assoc. M. Jan. 6, 1892; M. Mar. 1, 1899

COLE, JOHN ADAMS. Civ. and Cons. Engr., 271 East 53d St., Chicago, Ill..... Mar. 7, 1894

COLE, WILLIAM WEEDEN. Vice-Pres. and Gen. Mgr., Elmira Water, Light & R. R. Co., Realty Bldg., Elmira, N. Y..... Oct. 7, 1903

COLEMAN, CLARENCE. U. S. Asst. Engr., 519 Providence Bldg., Duluth, Minn..... Nov. 3, 1897

COLEMAN, FREDERICK ALBERT. 3175 Euclid Ave., Cleveland, Ohio ..... Jun. April 4, 1893; Assoc. M. April 5, 1899; M. Dec. 1, 1903

COLEMAN, JOHN FRANCIS. Cons. Engr., 920 Hibernia Bank Bldg., New Orleans, La..... Oct. 2, 1901

Date of Membership.

COLLINGWOOD, FRANCIS. Cons. Engr., Elizabeth, N. J.; Office address, 220 West 57th St., New York City ..... Mar. 3, 1869

COLLINS, DANIEL CHARLES NEWMAN. 29 Broadway, New York City .. April 3, 1901

COLLINS, RODERICK GREENE, Jr. 215 West 33d St., New York City .. May 4, 1904

COMSTOCK, CYRUS BALLOU. Bvt. Brig.-Gen., U. S. A., 124 East 27th St., New York City ..... Sept. 1, 1880

CONDRON, THEODORE LINCOLN. Cons. Civ. Engr., 1750 Monadnock Bldg., Chicago, Ill ..... Assoc. M. Feb. 1, 1899; M. Oct. 2, 1901

CONKLING, CLOUD CLIFFORD. Chf. Civ. Engr., Lackawanna Steel Co., 385 Richmond Ave., Buffalo, N. Y. ..... Jan. 4, 1905

CONN, FRANK WINSLOW. Chf. Engr., Transit Finance Co. of New York and Philadelphia, 2126 Land Title Bldg., Philadelphia, Pa. ..... June 1, 1904

CONNETT, ALBERT NEWMANN. Chf. Engr., J. G. White & Co., Ltd., 22a College Hill, London, E.C., England. Jun. June 6, 1883; M. Oct. 1, 1890

CONNOR, EDWARD HANSON. Engr., Mo. Val. Bridge & Iron Works, Leavenworth, Kans ..... Jun. Feb. 5, 1890; Assoc. M. Feb. 3, 1892; M. April 4, 1900

CONSTABLE, HOWARD. Archt. and Engr., 22 East 16th St., New York City ..... Dec. 7, 1892

COOKE, CHARLES HENRY. Cons. Engr., 44 Broad St., New York City .. Mar. 1, 1899

COOLEY, LYMAN EDGAR. 21 Quincy St., Chicago, Ill ..... June 1, 1898

COOLEY, MAURICE WURTZ. Mgr., The New Trinidad Lake Asphalt Co., Ltd., and New York & Bermudez Co., Port of Spain, Trinidad ..... Assoc. M. Mar. 7, 1894; M. Dec. 3, 1902

COOMBS, STEPHEN ELBRIDGE. Room 512, Grand Central Station, New York City ..... Sept. 3, 1902

COOPER, SAMUEL LISPENARD. Commr. of Public Works, Yonkers, N. Y. Feb. 6, 1889

N. COOPER, THEODORE. Cons. Engr., 45 Broadway, New York City ..... Mar. 4, 1874

CORNELL, GEORGE BIRDSALL. Cons. Engr., 20 Broad St., New York City ..... Jun. Aug. 6, 1879; M. Oct. 6, 1886

CORRY, THOMAS AVERY. Supt., Via Permanente Ferrocarril Mexicano, City of Mexico, Mexico ..... May 6, 1903

CORTHELL, ARTHUR BATEMAN. Terminal Engr., N. Y. C. & H. R. R. R., Grand Central Palace, 43d St. and Lexington Ave., New York City ..... Mar. 1, 1899

CORTHELL, ELMER LAWRENCE. 1 Nassau St., New York City ..... Sept. 2, 1874

COSBY, SPENCER. Capt., Corps of Engrs., U. S. A., Manila, Philippine Islands ..... Oct. 5, 1904

COTTON, JOSEPH P. Newport, R. I. ..... June 7, 1876

COURTENAY, WILLIAM HOWARD. Chf. Engr., L. & N. R. R. Co., Louisville, Ky ..... July 3, 1889

COVODE, JAMES HENRY. 1913 Pacific Ave., San Francisco, Cal. ..... April 2, 1890

COWLES, WALTER LINSLEY. Cons. Engr.; Secy., D. F. Holman Ry. Tracklayer Co., 1749 Railway Exchange, Chicago, Ill. ..... Mar. 6, 1889

COX, ABRAHAM BEEKMAN. Cherry Valley, N. Y. ..... April 1, 1874

Date of Membership.

Cox, Leonard Martin. Civ. Engr., U. S. N., Superv. Engr., Steel Floating Dock for Cavite, P. I., Sparrows Point, Md ..... Assoc. M. Oct. 4, 1899; M. Jan. 5, 1904

Craig, Chambers McKibbin. Address Unknown ..... Nov. 3, 1886

CRAIGHILL, WILLIAM PRICE. (*Past-President*). Retired Chf. of Engrs. and Brig.-Gen., U. S. A., Charlestown, Jefferson Co., W. Va. ..... M. Oct. 7, 1885; Hon. M. Mar. 23, 1896

Crandall, Charles Lee. Prof. of Ry. Eng. and Geodesy; in Chg. of the Coll. of Civ. Eng., Cornell Univ., Ithaca, N. Y. ..... Jun. June 7, 1876; M. Oct. 5, 1892

Crane, Albert Sears. Prin. Asst. Engr., San. Dist. of Chicago, 1003 Security Bldg., Chicago, Ill. ..... Jun. Sept. 3, 1895; Assoc. M. May 4, 1898; M. May 1, 1901

Crane, Francis Elihu. City Engr., Amsterdam, N. Y. ..... Oct. 1, 1902

CRAVEN, ALFRED. (*Director*). 320 Broadway, New York City. ..... Dec. 5, 1888

Crawford, William. P. O. Box 487, Ottawa, Ont., Canada ..... Nov. 7, 1888

Crehore, William Williams. Cons. Engr., 116 Nassau St., New York City ..... Assoc. M. April 4, 1894; M. Sept. 3, 1902

Creuzbaur, Robert Walter. Engr., Dept. of Finance, Room 51, 280 Broadway, New York City ..... Jun. April 2, 1890; Assoc. M. April 4, 1894; M. April 4, 1900

Crocker, Herbert Samuel. Asst. Erecting Mgr., Western Div., Am. Bridge Co. of N. Y., 1247 Monadnock Blk., Chicago, Ill. ..... Oct. 2, 1901

N. CROES, JOHN JAMES ROBERTSON. (*Past-President*). Cons. Engr., 68 Broad St., New York City ..... Dec. 4, 1867

Crosby, Benjamin Lincoln. Prin. Asst. Engr., N. P. Ry. Co., Tacoma, Wash ..... Jun. June 2, 1880; M. Oct. 6, 1886

Crosby, Horace. City Engr., New Rochelle, N. Y. ..... Feb. 17, 1869

Crowell, Foster. Cons. Engr., 18 Broadway, New York City ..... Dec. 1, 1880

Crozier, William. Brig.-Gen., Chf. of Ordnance, U. S. A., War Dept., Washington, D. C. ..... Feb. 1, 1905

Crump, Ralph Lee. Edgewater, Bergen Co., N. J. ..... Dec. 3, 1902

Cummings, Robert Augustus. Cons. and Const. Engr., House Bldg., Pittsburg, Pa. ..... Jun. Oct. 1, 1890; Assoc. M. May 4, 1892; M. June 1, 1898

Cummings, William Warren. Supt. of Isolated Plant Dept., Edison Elec. Illuminating Co., 3 Head Pl., Boston, Mass. ..... June 7, 1899

Cunningham, Andrew Chase. Civ. Engr., U. S. N., U. S. Naval Academy, Annapolis, Md ..... Assoc. M. Sept. 2, 1891; M. Oct. 3, 1894

Cunningham, Andrew Oswald. Bridge Engr., Wabash R. R., Lincoln Trust Bldg., St. Louis, Mo. ..... Feb. 5, 1902

Cunningham, David West. 627 West 18th St., Los Angeles, Cal. ..... May 7, 1873

Cunningham, James Henry. 2 Ravelston Pl., Edinburgh, Scotland .. Aug. 6, 1879

Cunningham, Joseph Hooker. Chf. Engr., Union Light & Power Co., 728 Chamber of Commerce, Portland, Ore ..... Assoc. M. Sept. 6, 1899; M. Feb. 2, 1904

Curry, Charles White. Tustin, Orange Co., Cal. ..... Mar. 2, 1904

Date of Membership.

CURTIS, FAYETTE SAMUEL. (*Vice President*). Fourth Vice-Pres., N. Y., N. H. & H. R. R. Co., South Terminal Station, Boston, Mass. ..... April 3, 1889

CURTIS, WALTER WHALEY. Cons. Engr., 324 Dearborn St., Chicago, Ill. ..... Sept. 5, 1888

CUSHING, EDWARD BENJAMIN. Gen. Supt., Harriman Lines in La., New Orleans, La. ..... Nov. 1, 1893

CUSHING, WILLIAM CHANNING. Chf. Engr., M. of W., S. W. System, Penn. Lines, Union Station, Pittsburg, Pa. ..... Jun. June 5, 1889; Assoc. M. Nov. 4, 1891; M. May 1, 1901

CUTSHAW, WILFRED EMORY. City Engr., Richmond, Va. ..... Mar. 4, 1891

DABNEY, AUGUSTINE LEE. Contr. Engr., 43½ Madison St., Room 18, Memphis, Tenn. ..... Oct. 2, 1901

DAKIN, ALBERT HARLOW, Jr. 370 St. Nicholas Ave., New York City. ..... April 1, 1903

DANFORTH, FREDERIC. 29 Pleasant St., Gardiner, Me. ..... Sept. 2, 1891

DARLING, FRED STEERE. Div. Engr. of Constr., C. P. Ry., Windsor St. Station, Montreal, Que., Canada. ..... Oct. 7, 1903

DARLING, JOHN HENRY. U. S. Prin. Asst. Engr., 532 West Third St., Duluth, Minn. ..... May 1, 1901

DARLING, WILLIAM LAFAYETTE. Chf. Engr., Rock Island System, Chicago, Ill ..... Oct. 5, 1892

DARRACH, CHARLES GOBRECHT. Cons. Engr., Ridley Park, Del. Co., Pa. ..... Jan. 5, 1876

DART, CARLTON ROLLIN. Bridge Engr., San. Dist. of Chicago, 1007 Security Bldg., Chicago, Ill ..... May 6, 1903

DART, JUSTUS VINTON. Asst. Engr. in Chg. of Highway Dept., City Hall, Providence, R. I. ..... April 4, 1900

DATESMAN, GEORGE ELVIN. Prin. Asst. Engr., Bureau of Surveys, 416 City Hall, Philadelphia, Pa ..... Feb. 4, 1903

DAUCHY, WALTER EDWARD. Div. Engr., Culebra Div., Isthmian Canal Comm., Culebra, Canal Zone, Panama, Care, New York Post Office. Nov. 4, 1903

DAVIES, JOHN VIPOND. Cons. Engr. (Jacobs & Davies), 128 Broadway, New York City. ..... June 6, 1894

DAVIS, ARTHUR POWELL. Asst. Chf. Engr., Reclamation Service, U. S. Geological Survey, Washington, D. C. ..... Assoc. M. June 7, 1893; M. Oct. 4, 1899

DAVIS, CHANDLER. 499 Fifth Ave., New York City. ..... Jun. Dec. 3, 1890; Assoc. M. Feb. 6, 1895; M. Oct. 4, 1899

DAVIS, CHARLES. County Engr., Allegheny Co., Pa., Court House, Pittsburg (Res., 912 Western Ave., Allegheny), Pa. ..... Sept. 15, 1869

DAVIS, CHARLES E. L. B. Lt.-Col., Corps of Engrs., U. S. A., Jones Bldg., Detroit, Mich. ..... July 12, 1877

DAVIS, CHARLES HENRY. 25 Broad St., New York City. ..... Dec. 4, 1895

DAVIS, CHESTER BIRGE. Cons. Engr., Dallas, Tex ..... Feb. 1, 1882

DAVIS, JOHN ROSE WILSON. Engr., M. of W., G. N. Ry. Line, St. Paul, Minn. ..... Nov. 4, 1903

Date of Membership.

DAVIS, JOSEPH BAKER. Prof. of Geodesy and Surv. and Assoc. Dean, Dept. of Eng., Univ. of Mich., Ann Arbor, Mich. — Jun. April 1, 1874; M. Oct. 5, 1898

DAVIS, JOSEPH PHINEAS. Cons. Engr., 1170 Broadway, New York City. Jan. 29, 1868

DAVIS, ROBERT BENJAMIN. Designing Engr., Bost. Elev. Ry. Co., 101 Milk St., Boston, Mass. July 3, 1889

DAVISON, GEORGE STEWART. (*Director*). Cons. Engr., 514 Smithfield St., Pittsburg, Pa. April 2, 1890

DAWLEY, EDWIN PELEG. Asst. Chf. Engr., N. Y., N. H. & H. R. R., South Terminal Station, Boston, Mass. April 1, 1885

DEAN, ARTHUR WARREN. State Engr., 8 Hall Ave., Nashua, N. H. May 4, 1904

DEAN, LUTHER. Taunton, Mass. May 4, 1898

DEANS, JOHN STERLING. Chf. Engr., The Phœnix Bridge Co., Phœnixville, Pa. May 4, 1887

DEEN, JAMES WORK. Div. Engr., D. & R. G. R. R., Salida, Colo. Jan. 6, 1892

DEFREES, MORRIS M. 55 Ingalls Blk., Indianapolis, Ind. Mar. 3, 1880

DE FUNIAK, FREDERICK. Cons. Engr., 204 East Chestnut St., Louisville, Ky. May 7, 1873

DE LA BARRE, WILLIAM. Engr., Agt. and Treas., St. Anthony Falls Water Power Co., Minneapolis, Minn. April 5, 1893

DELANO, FREDERIC ADRIAN. Gen. Mgr., C., B. & Q. R. R., Chicago, Ill. June 4, 1902

DENNIS, ARTHUR CRISFIELD. Clarksburg, W. Va. Dec. 4, 1901

DENNIS, WILLIAM FRANKLIN. Vice-Pres., Hill-Cunningham Co., Cons. Geologists and Engrs., 25 Broad St., Room 1128, New York City. Feb. 1, 1888

DEBBY, GEORGE MCCLELLAN. Maj., Corps of Engrs., U. S. A., U. S. Engr. Office, St. Paul, Minn. April 1, 1896

DERRICK, HENRY CLAY. Houston, Halifax Co., Va. Oct. 5, 1887

DE VARONA, IGNACIO MARÉA. Chf. Engr., Dept. of Water Supply, Gas and Electricity, Brooklyn, N. Y. April 7, 1886

DEVIN, GEORGE. 1 Newark St., Hoboken, N. J. Sept. 7, 1887

DE WITT, PHILIP HOFFECKER. Cons. Engr., G. B. Markle & Co., Jeddo, Pa. May 5, 1897

DEYO, SOLOMON LEFEVRE. (*Vice-President*). Chf. Engr., Interborough Rap. Trans. Co., 2108 Fifth Ave., New York City. June 6, 1888

DIDIER, PAUL. Asst. Chf. Engr., B. & O. R. R. Co., Allegheny City, Pa. Mar. 6, 1889

DIEBITSCH, EMIL. Gen. Mgr. for John Peirce, 277 Broadway (Res., 80 Washington Sq.), New York City. — Jun. Feb. 28, 1893; Assoc. M. Oct. 6, 1897; M. Mar. 5, 1902

DILLENBECK, CLARK. Civ. Engr. and Archt.; Asst. Engr., P. & R. Ry. Co., 502 Reading Terminal, Philadelphia, Pa. June 1, 1904

DILLMAN, GEORGE LINCOLN. Chf. Engr., Western Pacific Ry., San Francisco, Cal. Mar. 4, 1891

D'INVILLIERS, CAMILLE STANISLAUS. Engr. of Constr., P. R. R., Cresson, Pa. Jan. 4, 1888

DIXON, CHARLES YOUNG. U. S. Asst. Engr., Amherstburg, Ont., Canada. Nov. 4, 1903

		Date of Membership.
Doane, Walter A. City Civ. Engr., Meadville, Pa		Sept. 7, 1881
Donovan, Cornelius. U. S. Asst. Engr., Room N, Custom House, New Orleans, La		Oct. 4, 1899
Donovan, John Joseph. Chf. Engr. and Gen. Supt., B. B. & B. C. R. R.; Gen. Mgr., Bellingham Bay Impvt. Co., Bellingham, Wash	Jun. M.	April 7, 1886 April 4, 1888
Doremus, Abraham Fairbanks. State Engr., Salt Lake City, Utah		Oct. 4, 1893
Dorr, Edgar Sutton. Chf. Engr., Sewer Div., Street Dept., 30 Tremont St., Boston, Mass		April 3, 1895
Dose, Henry Frederick. Res. Engr., Isthmian Canal Comm., Bohio, Panama		Jan. 6, 1904
Douglas, Benjamin. Bridge Engr., Mich. Cent. R. R., Detroit, Mich	Jun. M.	June 1, 1887 Jan. 2, 1890
Douglas, Edward Morehouse. Geographer, U. S. Geological Survey, Washington, D. C		Dec. 4, 1901
Drake, Albert Bailey. 164 William St., New Bedford, Mass		Oct. 4, 1893
Drake, William Abial. Chf. Engr. and Gen. Supt., S. F., P. & P. Ry. Co., Prescott, Ariz		Dec. 5, 1883
Du Bois, Augustus Jay. Prof. of Civ. Eng., Sheffield Scientific School, New Haven, Conn	Jun. M.	July 7, 1875 Oct. 5, 1892
Dudley, Charles Benjamin. Chemist, P. R. R. Co., Drawer 156, Altoona, Pa		Mar. 2, 1892
Duggan, George Herrick. Third Vice-Pres., Dominion Coal Co., Ltd., Glace Bay, N. S., Canada		Oct. 2, 1895
Dun, James. Chf. Engr., A., T. & S. F. Ry. System, 1033 Railway Exchange Bldg., Chicago, Ill		June 7, 1876
Duncklee, John Butler. Civ. and Cons. Engr., 170 Broadway, New York City		April 2, 1873
Dunham, Herbert Franklin. 220 Broadway, New York City		Oct. 1, 1890
Dunham, Lewis Augustus. Cons. Engr., Am. Zinc Extraction Co., 318 Dwight Bldg., Kansas City, Mo		June 3, 1903
Dunlap, De Clermont. 440 E. 57th St., Chicago, Ill		Jan. 4, 1888
Dunlap, Frederic Clark. Asst. Engr. in Chg., Torresdale Filters, 7821 Walker St., Holmesburg, Philadelphia, Pa		June 1, 1904
Dunn, Daniel Burke. Div. Engr., Constr., Atlanta & Birmingham Air Line Ry., 1007 English-American Bldg., Atlanta, Ga.		Dec. 2, 1891
Duryea, Edwin, Jr. Chf. Engr., Bay Cities Water Co., 1009 Mutual Bank Bldg., San Francisco, Cal.	Jun. Assoc. M. M.	Feb. 2, 1887 Sept. 4, 1895 Feb. 2, 1898
Dyer, Arthur James. Engr., Great Falls Power Co., 63 Arcade Bldg., Nashville, Tenn	Assoc. M. M.	Mar. 6, 1901 Feb. 4, 1903
Earl, George Goodell. Gen. Supt. and Chf. Engr., Sewerage and Water Board, 602 Carondelet St., New Orleans, La	Jun. Assoc. M. M.	May 7, 1890 Dec. 2, 1891 April 4, 1894
Earley, John Edwin. Civ., Hydr. and San. Engr., Calle Ortega No. 28, City of Mexico, Mexico		April 5, 1876

		Date of Membership.
EASBY, MARMADUKE WARD. Cons. and Const. Engr., 1420 Chestnut St., Philadelphia, Pa.	Assoc. M.	Nov. 4, 1891
	M.	Dec. 1, 1897
EASBY, WILLIAM, Jr. Asst. Prof. of Civ. Eng., College Hall, Univ. of Pennsylvania, Philadelphia, Pa		Jan. 4, 1905
EASTWOOD, JOHN THOMPSON. First Asst. Engr., Sewerage, Sewerage and Water Board, New Orleans, La.	Jun.	Mar. 6, 1894
	Assoc. M.	Feb. 1, 1899
	M.	Sept. 6, 1904
EATON, FREDERICK. California Club, Los Angeles, Cal		May 5, 1886
ECKART, WILLIAM ROBERTS. Cons. Engr., Room 4, Nevada Blk., San Francisco, Cal		Jan. 5, 1881
ECKERT, EDWARD WILLIAM. 452 West 153d St., New York City		Feb. 3, 1886
EDES, WILLIAM CUSHING. Asst. Engr., S. P. Co., San Francisco, Cal	Jun.	Sept. 1, 1886
	M.	Nov. 4, 1896
EDWARDS, HARRY WINTER. Chf. Engr., Chihuahua & Pacific R. R., Chihuahua, Chih., Mexico		June 4, 1890
EDWARDS, JAMES HARVEY. Asst. Chf. Engr., Am. Bridge Co., in Chg. of Bldg. Constr.; Res., Oxford, Chenango Co., N. Y.	Jun.	May 31, 1892
	Assoc. M.	May 2, 1894
	M.	May 4, 1898
EDWARDS, NATHANIEL MARSH. Hydr. Engr., 814 College Ave., Appleton, Wis.		June 3, 1874
EIDLITZ, OTTO MARC. Engr. and Builder, 489 Fifth Ave., New York City		Sept. 2, 1902
ELDRIDGE, ARCHIBALD RONALDSON. Chf. Draftsman, C., B. & Q. Ry., Bridge Dept., 209 Adams St., Chicago, Ill.		Oct. 2, 1901
ELDRIDGE, GRIFFITH MORGAN. Mgr., Eldridge Drug Stores, Americus, Ga.	Assoc. M.	June 1, 1892
	M.	Sept. 3, 1902
ELLIOTT, CHARLES GLEASON. Engr. in Chg. of Drainage Investigations, Office of Experiment Stations, U. S. Dept. of Agriculture, Washington, D. C.		Sept. 3, 1890
ELLIOTT, JAMES RUTHERFORD. Civ. and Min. Engr., (Elliot & Baton), Keystone Bldg., Pittsburg, Pa.	Assoc. M.	Sept. 4, 1901
	M.	April 5, 1904
ELLIS, GEORGE EZRA. Signal Engr., C., R. I. & P. Ry., Room 8, La Salle St. Station, Chicago, Ill.	Jun.	Mar. 2, 1897
	Assoc. M.	Mar. 7, 1900
	M.	Dec. 4, 1901
ELLIS, JOHN WALDO. (*Director*). Cons. Engr., Woonsocket, R. I.		July 3, 1895
ELLIS, SAMUEL CLARENCE. 1750 Beacon St., Brookline, Mass.		Aug. 7, 1872
ELLSWORTH, EMORY ALEXANDER. Civ., Mech., Architectural and Cons. Engr., 18 Dwight St., Holyoke, Mass.		June 1, 1904
ELMER, HOWARD NIXON. Mgr., Chicago Office, The Trenton Iron Co., 1114 Monadnock Blk., Chicago, Ill.		April 7, 1886
ELWELL, CHARLES CLEMENT. Supt., Shore Line Div., N. Y., N. H. & H. R. R. Co., New London, Conn		July 1, 1891
ELY, THEODORE NEWEL. Chf. of Motive Power, P. R. R. Lines East and West of Pitts., Broad St. Station, Philadelphia, Pa		Mar. 2, 1881
EMERSON, GUY CARLETON. Cons. Civ. Engr., 19 Grovenor Rd., Boston, Mass.		May 4, 1904
EMERY, JAMES ALBERT. Vice-Pres. and Res. Gen. Mgr., Birmingham Ry., Light & Power Co., Birmingham, Ala.		June 4, 1902

Date of Membership.

EMIGH, JOHN H. Cons. Engr., North Adams, Mass. — April 3, 1901

EMMONS, CHARLES MORTON. Asst. Engr. in Chg. of Designing and Estimating, with Penn Bridge Co., Beaver Falls, Pa. — April 1, 1903

ENDICOTT, MORDECAI THOMAS. Rear-Admiral and Civ. Engr., U. S. N.; Chf. of Bureau of Yards and Docks, U. S. Navy Dept., Washington, D. C. — April 4, 1877

ENGLE, ROBERT L. 1530 Westminster Ave., Cincinnati, Ohio. — Sept. 7, 1881

ENO, FRANK HARVEY. Assoc. Prof. of Civ. Eng., Ohio State Univ., Columbus, Ohio. — Mar. 4, 1903

ERICSON, JOHN ERNST. City Engr. of Chicago; Res., 1914 Arlington Pl., Chicago, Ill. — May 7, 1902

ERLANDSEN, OSCAR. Dept. of Bridges, 32 Sutton Pl., New York City.
- Jun. — May 1, 1889
- Assoc. M. — Dec. 2, 1891
- M. — Oct. 7, 1896

ERNST, OSWALD HERBERT. Col., Corps of Engrs., U. S. A.; Pres., Mississippi River Comm.; Mem., International Lake Levels Comm.; Div. Engr., N. W. Div., 1637 Indiana Ave., Chicago, Ill. — July 4, 1888

EVANS, GEORGE EDWIN. Civ. and Hydr. Engr., 95 Milk St., Boston, Mass. — May 2, 1888

EVANS, LOUIS HYDE. Contr. Engr., 7 East 42d St., New York City. — July 3, 1889

EVANS, RICHARD. Room 1, Town Hall, Jamaica, Queens Co., N. Y. — June 7, 1893

EWEN, JOHN MEIGGS. 143 Dearborn St., Chicago, Ill. — June 3, 1903

EWING, WILLIAM BION. City Engr., La Grange, Ill.
- Jun. — April 3, 1889
- Assoc. M. — Feb. 3, 1892
- M. — Nov. 2, 1898

FAIRLEIGH, JAMES ANDREW. With Western Cement Co., Louisville, Ky. — Sept. 2, 1891

FANNING, JOHN THOMAS. Cons. Engr., 330 Hennepin Ave., Minneapolis, Minn. — Aug. 7, 1872

FARLEY, GODFREY PEARSON. Pres. and Chf. Engr., W. W. & F. R. R. Co., Wiscasset, Me. (also 100 Broadway, New York City). — June 6, 1900

FARLEY, JOHN MOYER. Cons. Engr., White Plains, N. Y.
- Jun. — Dec. 5, 1888
- Assoc. M. — July 1, 1891
- M. — Sept. 1, 1897

FARNUM, HENRY HARRISON. 324 East 150th St., New York City. — July 1, 1891

FARRAR, HARTWELL PRENTICE. Cons. Engr., Jackson, Tenn. — Nov. 1, 1893

FARRINGTON, HARVEY. Cons. Engr., 115 Broadway, New York City.
- Jun. — June 19, 1891
- Assoc. M. — Feb. 6, 1895
- M. — Oct. 1, 1902

FAY, FREDERIC HAROLD. Asst. Engr., Eng. Dept., 60 City Hall, Boston, Mass.
- Jun. — Oct. 2, 1894
- Assoc. M. — April 2, 1902
- M. — Jan. 5, 1904

FEHR, HARRISON ROBERT. Gen. Mgr., Easton Transit Co., Easton, Pa. — Oct. 5, 1898

FELT, CHARLES FREDERICK WILSON. Chf. Engr., Gulf, Colo. & S. F. Ry., Galveston, Tex. — Mar. 3, 1897

FELTON, BURTON ROGERS. Treas., C. E. Trumbull Co., Engrs. and Contrs., Tremont Bldg., Boston, Mass.
- Assoc. M. — April 4, 1894
- M. — Oct. 7, 1896

		Date of Membership.
FELTON, HERBERT CLARK. Supt., Del. River Ferry Co. of N. J. of P. & R. Ry. System, Camden, N. J.		June 1, 1887
FELTON, SAMUEL MORSE. 919 Railway Exchange Bldg., Chicago, Ill.		Jan. 4, 1882
FENDALL, BENJAMIN TRUMAN. City Engr., City Hall (Res., 128 W. Lafayette Ave.), Baltimore, Md.		May 7, 1902
FERGUSON, GEORGE ROBERT. Asst. Engr., Dept. of Bridges, 1215 Park Row Bldg., New York City.		Dec. 3, 1902
FERGUSON, HARDY SMITH. Chf. Engr., Great Northern Paper Co., Millinocket, Me.	Assoc. M. M.	Mar. 3, 1897 May 1, 1901
FERGUSON, JOHN WILLIAM. Engr. and Bldg. Contr., Paterson, N. J.	Jun. M.	Jan. 5, 1881 Feb. 2, 1887
FERNSTROM, HENNING. Chf. Engr., N. Y. C. & H. R. R. R., 519 Grand Central Station, New York City.		May 7, 1902
FERRY, CHARLES ADDISON. With A. B. Hill, Cons. Civ. Engr., 24 Edgewood Ave., New Haven, Conn.	Jun. M.	May 4, 1881 Jan. 2, 1889
FICKES, EDWIN STANTON. Chf. Engr. and Purchasing Agt. for The Pittsburg Reduction Co., Pittsburg, Pa.	Jun. Assoc. M. M.	Jan. 4, 1898 Feb. 6, 1901 Dec. 6, 1904
FIEBEGER, GUSTAVE JOSEPH. Lt.-Col., Corps of Engrs.; Prof. of Eng., West Point, N. Y.		Oct. 2, 1895
FIELD, GEORGE SPENCER. 452 Delaware Ave., Buffalo, N. Y.		April 7, 1880
FIELD, WILLIAM PIERSON. 976 Broad St., Newark, N. J.	Jun. M.	Dec. 7, 1887 Mar. 6, 1901
FIELDS, SAMUEL JAMES. 632 Ellicott St., Buffalo, N. Y.		Mar. 5, 1884
FILLEY, HIEL HAMILTON. 2836 Campbell St., Kansas City, Mo.		Jan. 3, 1883
FINK, RUDOLPH. Rural Free Delivery Route No. 20, St. Matthews, Ky.		Sept. 21, 1870
FINLEY, WILLIAM HENRY. Prin. Asst. Engr., C. & N. W. Ry. Co., Winnetka, Ill.		Feb. 4, 1903
FIRMSTONE, FRANK. Easton, Pa.		Aug. 7, 1878
FISHER, EDWIN AUGUSTUS. (*Director*). City Engr., 294 Troup St., Rochester, N. Y.		July 4, 1888
FISHER, ELSTNER. Gen. Supt. and Chf. Engr., Toronto, Hamilton & Buffalo Ry., Hamilton, Ont., Canada	Jun. Assoc. M. M.	April 3, 1889 June 2, 1897 Mar. 5, 1902
FISHER, FRANCIS DAVIS. Care, Degnon Contr. Co., 13 Park Row, New York City.		May 2, 1888
FISHER, JANON. Ruxton, Md.	Assoc. M. M.	May 4, 1892 Jan. 5, 1898
FISHER, SAMUEL BROWNLEE. Chf. Engr., Mo., Kans. & Tex. Ry. Co., 406 Wainwright Bldg., St. Louis, Mo.		Oct. 7, 1903
FISK, WALTER LESLIE. Maj., Corps of Engrs., U. S. A., 33 Campau Bldg., Detroit, Mich.		April 1, 1896
FITCH, ASA BETTS. 673 Walsworth Ave., Oakland, Cal.		Mar. 5, 1884
FITCH, CHARLES HALL. Superv. Engr., U. S. Geological Survey, 3108 Q St., N. W., Washington, D. C.		June 5, 1901
FITCH, CHARLES LINCOLN. 253 Throop Ave., Brooklyn, N. Y.		Oct. 2, 1901

Date of Membership.

FITCH, GRAHAM DENBY. Maj., Corps of Engrs., U. S. A., U. S. Engr. Office, Little Rock, Ark. — Feb. 4, 1903

N. FITZGERALD, DESMOND. (*Past-President*). Cons. Hydr. Engr., Brookline, Mass. — Sept. 3, 1884

FITZGERALD, JOHN LELAND. City Engr., Schenectady, N. Y. — Jan. 2, 1889

FLAD, EDWARD. Cons. Engr., 1009 Fullerton Bldg., St. Louis, Mo. — Jun. Jan. 7, 1885; M. Feb. 1, 1888

FLAGG, JOSIAH FOSTER. Care, Brown, Shipley & Co., 123 Pall Mall, London, S. W., England. — Oct. 7, 1874

FLEMING, *Sir* SANDFORD. Cons. Engr., Ottawa, Ont., Canada — Sept. 18, 1872

FLOESCH, JACOB MARTIN. Chf. Engr., B., R. & P. Ry. Co., Rochester, N. Y. — Jan. 4, 1905

FOLLETT, WILLIAM W. U. S. Cons. Engr., International Boundary Comm., United States and Mexico, El Paso, Tex. — July 5, 1893

FOLWELL, AMORY PRESCOTT. Cons. Municipal Engr., Prof., Municipal Eng., Lafayette Coll., Easton, Pa. — Jun. Feb. 5, 1890; Assoc. M. June 7, 1893; M. Nov. 3, 1897

FOOTE, ARTHUR DEWINT. Supt., North Star Mines Co., Grass Valley, Cal. — May 7, 1884

FORCE, CYRUS GILDERSLEEVE. Cons. Civ. Engr., Flanders, Morris Co., N. J. — Feb. 6, 1878

FORD, PORTER DWIGHT. Cons. and Constr. Engr., Park Row Bldg., New York City. — Jan. 4, 1905

FORD, WILLIAM GRIFFING. 200 Montague St., Brooklyn, N. Y. — Oct. 5, 1904

FORGIE, JAMES. Chf. Asst. Engr., Pennsylvania R. R. Tunnels (N. R. Div.), 1 West 34th St., New York City. — Oct. 5, 1904

FORSYTH, ROBERT. Cons. Engr., 1159 The Rookery, Chicago, Ill. — May 12, 1875

FORT, EDWIN JOHN. Dept. of Highways, Municipal Bldg., Brooklyn, N. Y. — Assoc. M. April 1, 1896; M. Nov. 1, 1904

FORTIN, SIFROY JOSEPH. Representing Milliken Bros., Apartado 2019, City of Mexico, Mexico. — Assoc. M. Nov. 6, 1895; M. Dec. 6, 1904

FOSS, FRED EUGENE. Prof. of Civ. Eng., The Pennsylvania State Coll., State College, Pa. — April 1, 1903

FOSTER, ERNEST HOWARD. Vice-Pres., Power Specialty Co., 126 Liberty St., New York City — May 6, 1903

FOSTER, WILBUR FISK. Engr. and Contr., 3 Berry Blk., Nashville, Tenn. — May 7, 1873

FOUQUET, JOHN DOUGLAS. Architectural Dept., N. Y. C. & H. R. R. R., Room 600, Grand Central Station, New York City (Res., Fishkill, N. Y.) — June 3, 1885

FOWLER, CHARLES EVAN. Pres., International Contract Co., 737 New York Blk., Seattle, Wash. — Jun. May 7, 1890; Assoc. M. Dec. 6, 1893; M. May 3, 1898

FOWLER, THOMAS WALKER. Univ. of Melbourne, Melbourne, Victoria, Australia — Dec. 2, 1903

FOX, STEPHENSON WATERS. Cons. Engr. (Fox & Smith), Kansas City Life Bldg., Kansas City, Mo. — Jun. July 7, 1880; M. Oct. 6, 1886

Date of Membership.

FRANCIS, CHARLES. 8 Masonic Temple, Davenport, Ia. ..... May 4, 1892

FRANCIS, GEORGE BLINN. Civ. Engr., Westinghouse, Church, Kerr & Co., 10 Bridge St., New York City ..... Jun. Sept. 5, 1883; M. Nov. 7, 1888

FRANCIS, HENRY NEWTON. Arlington, R. I. ..... Jun. Mar. 1, 1876; M. Nov. 7, 1888

FRANCIS, WALTER JOSEPH. Engr. of Hydr. Locks, Trent Canal, Peterborough, Ont., Canada ..... Assoc. M. May 1, 1901; M. April 5, 1904

FRAZIER, HARRY. Cons. Engr., Seaboard Air Line R. R., 812 Am. Bank Bldg., Richmond, Va. ..... May 1, 1889

FRAZIER, JAMES LEWIS. Gen. Mgr., California Northwestern Ry. and North Shore R. R., 222 Sansome St., San Francisco, Cal. ..... Sept. 1, 1880

N. FREEMAN, JOHN RIPLEY. Consulting, Hydraulic and Mill Engr.; also Pres. and Treas., Manufacturers Mutual Fire Insurance Co., 815 Banigan Bldg., Providence, R. I. .. Jun. June 7, 1882; M. April 3, 1889

FRENCH, ALEXIS HENRY. Town Engr., Town Hall, Brookline; also of firm of French & Bryant, 334 Washington St., Brookline, and 4 State St., Boston, Mass. ..... June 6, 1894

FRENCH, ALFRED WILLARD. Pres., The French Oil Mill Machinery Co., Piqua, Ohio ..... May 2, 1900

FRENCH, ARTHUR WILLARD. Prof. of Civ. Eng., Worcester Polytechnic Inst., Worcester, Mass. ..... Assoc. M. April 4, 1900; M. Dec. 6, 1904

FRENCH, JAMES BENTON. Bridge Engr., Long Island R. R., 5 Hanson Pl., Brooklyn, N. Y. ..... Jun. Feb. 6, 1889; Assoc. M. Feb. 7, 1894; M. Nov. 2, 1898

FRENCH, OWEN BERT. Asst., Coast and Geodetic Survey, Washington, D. C. ..... April 1, 1903

FREW, ARCHIBALD SMITH. Chf. Engr., Chillagoe Ry. & Mines Co., Ltd., Mareeba, Queensland, Australia ..... Oct. 3, 1900

FREYHOLD, FELIX. 236 First St., S. E., Washington, D. C. ..... Assoc. M. Sept. 2, 1891; M. April 2, 1902

FRINK, ELLIS ALEXANDER. Supt. of Constr., Virginia Bridge & Iron Co., Roanoke, Va ..... Assoc. M. June 6, 1900; M. Dec. 4, 1901

FRITCH, LOUIS CHARLTON. Care, Gen. Supt. Transportation, Ill. Cent. R. R., Chicago, Ill ..... Oct. 3, 1900

FRITZ, JOHN. Bethlehem, Pa. ..... M. July 5, 1893; Hon. M. Sept. 5, 1899

FRIZELL, JOSEPH PALMER. Civ. and Hydr. Engr., 75 Linden St., Dorchester Dist., Boston, Mass. ..... Jan. 3, 1883

FRYE, ALBERT IRVIN. 426 Jefferson Ave., Elizabeth, N. J ..... Dec. 2, 1896

FUERTES, JAMES HILLHOUSE. Hydr. and San. Engr., 140 Nassau St., New York City ..... Jun. May 2, 1888; M. Feb. 6, 1895

FULLER, FRANK LOUIS. 12 Pearl St., Boston, Mass. ..... Jun. April 4, 1883; M. April 4, 1888

FULLER, FRANKLIN IDE. Gen. Mgr., Portland Consolidated Ry. Co., 421 Mohawk Bldg., Portland, Ore ..... Jan. 6, 1886

R. FULLER, GEORGE WARREN. (Hering & Fuller, Hydr. and San. Engrs.), 170 Broadway, New York City. ..... Assoc. M. Mar. 1, 1899; M. May 31, 1904

		Date of Membership.
Fuller, Harry. Engr., The King Bridge Co., Cleveland, Ohio		Sept. 7, 1904
Fuller, William Barnard. Cons. Civ. Engr., 170 Broadway, New York City	Jun.	June 3, 1885
	M.	May 1, 1895
Fulton, John Addison. 92 Marston Ave., Detroit, Mich		May 4, 1887
Furber, William Copeland. Archt. and Cons. Engr., Commercial Union Bldg., Philadelphia, Pa		May 2, 1899
Fyfe, James Lincoln. (E. C. and R. M. Shankland), 1106 Rookery, Chicago, Ill		Oct. 5, 1904
Gadsden, George Morrall. Director of Public Works, Savannah, Ga..		May 4, 1898
Gahagan, Walter Hamer. Contr. Engr., 189 Montague St., Brooklyn, N. Y	Jun.	Sept. 5, 1888
	Assoc. M.	July 1, 1891
	M.	April 3, 1901
Gamble, Francis Clarke. Public Works Engr., Insp. of Dykes and Insp. of Railways, British Columbia, Victoria, B. C., Canada...		April 1, 1891
Gardiner, Edmund LeBreton. Pres., Jersey City Water Supply Co., 158 Ellison St., Paterson, N. J		June 7, 1882
Gardner, Martin Luther. Asst. Engr., P. R. R., Jersey City (Res., 58 Elizabeth Ave., Newark), N. J....	Assoc. M.	Sept. 2, 1891
	M.	Mar. 4, 1896
Gardner, William Montgomery. U. S. Asst. Engr., U. S. Engr.'s Office, Memphis, Tenn		Dec. 7, 1904
Garrison, Everett. City Engr., City Hall, Newburgh, N. Y.....		Mar. 7, 1894
Gaston, Louis Prevost. 143 Liberty St., New York City.....		Feb. 1, 1905
Gatchell, George Samuel. Mgr., Buffalo Elevating Co., Buffalo, N. Y.....		May 7, 1884
Gates, Christopher Lawrence. Cons. Engr., 416 Irving St., Toledo, Ohio.....	Jun.	Dec. 4, 1878
	M.	Sept. 5, 1883
Gates, Horace Delphos. Asst. to City Engr., 311 Lyon St., San Francisco, Cal...		Mar. 7, 1883
Gay, Charles Webster. 25 Exchange St., Lynn, Mass.....		May 6, 1891
Gay, Martin. Asst. Engr., Dept. of Bridges, 21 Park Row, New York City.....	Jun.	June 4, 1884
	M.	June 5, 1889
Gayler, Carl. Bridge Engr., Street Dept., City Hall, St. Louis, Mo.		Sept. 3, 1884
Gayol, Roberto. Chf. Engr. of the Sautena Irrigation Works, P. O. Box 766, City of Mexico, Mexico.....		Mar. 2, 1892
Geddes, Edmund Burns. U. S. Asst. Engr., Natchez, Miss..		Mar. 2, 1898
Geddes, James Kennon. Gen. Mgr., Ohio River & Western Ry. Co., Zanesville, Ohio.....		Jan. 2, 1890
Geer, Harvey Mosher. Ballston, N. Y.....		June 6, 1894
Gemmell, Robert Campbell. Minas Bonanza y Anexas, Bonanza, Zac, via Saltillo, Coah, Mexico.....	Assoc. M.	Oct. 5, 1892
	M.	Dec. 4, 1895
Gerber, Emil. Asst. to Pres., Am. Bridge Co., Frick Bldg., Pittsburg, Pa.....		Feb. 1, 1888
Gerig, William. U. S. Asst. Engr., Lock Box 217, Memphis, Tenn..		Mar. 5, 1902
Gerry, Martin Hughes, Jr. Chf. Engr. and Gen. Mgr., Missouri River Power Co., Helena, Mont.....	Assoc. M.	June 6, 1900
	M.	Dec. 3, 1902
Gibbs, Charles Wingate. Kearney, Nebr.....		Jan. 2, 1889

Date of Membership.

GIBBS, GEORGE. Cons. Engr., Penn., N. Y. & L. I. R. R., N. Y. C. & H. R. R. R., Interborough Rap. Trans. Co.; Elec. Engr., Long Island R. R., First Vice-Pres., Westinghouse, Church, Kerr & Co., 10 Bridge St., New York City ..... Mar. 6, 1895

GIFFORD, GEORGE EDWIN. Contr. Engr., Milliken Bros., 11 Broadway, New York City ..... Assoc. M. Oct. 7, 1891; M. Jan. 1, 1896

GILES, ROBERT. Vice-Pres. and Mgr., National Bridge Works, 1123 Broadway, New York City ..... May 6, 1891

GILLETTE, EDWARD. Supt., Sheridan Div., C., B. & Q. Ry., Sheridan, Wyo ..... July 3, 1889

GILLETTE, HALBERT POWERS. Assoc. Editor, *Engineering News*, 19th Floor, St. Paul Bldg. (Res., 504 West 151st St.), New York City. May 4, 1904

GILLETTE, LEWIS SINGER. Pres., Elec. Steel Elevator Co., Minnesota Malleable Iron Co., Gulf Slate Co., Minneapolis, Minn..... June 7, 1899

GLADDING, HENRY HOLBROOK. Asst. City Engr., 30 Stanley St., New Haven, Conn..... Jun. July 1, 1885; M. Jan. 4, 1888

GLASGOW, ARTHUR GRAHAM. (Humphreys & Glasgow), 38 Victoria St., Westminster, London, England..... Jan. 3, 1900

GOAD, CHARLES EDWARD. 15 Wellington St., West, Toronto, Ont., Canada (also 185 St. James St., Montreal, Que., Canada, and 53 New Broad St., London, E. C., England)..... Sept. 7, 1881

GOING, ALVAH SEYMOUR. Asst. Engr., Grand Trunk Pacific Ry., Victoria, B. C., Canada..... Assoc. M. May 4, 1892; M. June 7, 1899

R. GOLDMARK, HENRY. Engr. of New Shops, Canadian Pacific Ry., Montreal, Que., Canada..... Jun. May 7, 1884; M. June 6, 1888

GOODALE, LOOMIS FARRINGTON. Engr., M. of W., Missouri Dist. of C., B. & Q. Ry., Globe Democrat Bldg., St. Louis, Mo..... Nov. 7, 1900

GOODNOUGH, XANTHUS HENRY. Chf. Engr., State Board of Health, Room 140, State House, Boston, Mass..... Assoc. M. May 6, 1896; M. June 4, 1902

GOODRICH, WILBUR FRANCIS. 10 Gibbens St., Somerville, Mass..... May 4, 1887

GOTSHALL, WILLIAM CHARLES. 76 William St., New York City..... May 7, 1902

GOULD, WILLIAM TILLOTSON. Asst. Engr., Terminal Site, Penn., N. Y. & L. I. R. R. Co., 225 West 33d St., New York City..... Jan. 2, 1890

GOWEN, CHARLES SEWALL. (*Director*). Ossining, N. Y..... Mar. 7, 1888

GRAFTON, CHARLES EDWIN. New Cumberland, W. Va..... Jan. 1, 1896

GRAHAM, CHARLES HALLETT. Engr. in Chg. of Sewers, Borough of the Bronx, 177th St. and Third Ave., New York City..... Sept. 7, 1887

GRAHAM, JOSEPH MARSHALL. Fourth Vice-Pres., Erie R. R., 21 Cortlandt St., New York City ..... April 4, 1900

GRANT, EMERSON WARREN. Asst. Engr., A., T. & S. F. Ry. Co., Topeka, Kans..... Dec. 4, 1889

GRANT, JUSTUS HERBERT. Contr. Engr., 82 German Insurance Bldg., Rochester, N. Y..... Mar. 2, 1892

GRANTHAM, HERBERT THOMAS. Chf. Engr., Belmont Iron Works, 1622 Real Estate Trust Bldg., Philadelphia, Pa..... Assoc. M. Feb. 5, 1896; M. May 7, 1902

GRAVES, EDWIN DWIGHT. Chf. Engr., Conn. River Bridge and Highway Dist. Comm., 650 Main St., Hartford, Conn. Assoc. M. Jan. 2, 1895; M. Dec. 2, 1896

Date of Membership.

GRAY, GEORGE EDWARD. Cons. Engr. 1155 Bush St., San Francisco, Cal. — M. July 2, 1873; Hon. M. June 5, 1894

GRAY, JOHN HENRY. 2019 Fuller Bldg., New York City — Oct. 2, 1895

GRAY, SAMUEL MERRILL. Cons. Engr., Room 930, Banigan Bldg., Providence, R. I — May 15, 1872

GREEN, BERNARD LINCOLN. Secy., The Osborn Eng. Co., Osborn Bldg., Cleveland, Ohio. — April 3, 1901

GREEN, BERNARD RICHARDSON. Supt., Building and Grounds, Library of Congress, Washington, D. C. — Oct. 2, 1889

GREEN, HUBERT EDWARD. Engr., U. S. Reclamation Service, 1108 Braly Bldg., Los Angeles, Cal. — Dec. 2, 1903

GREEN, RUTGER BLEECKER. Civ. Engr., The Solvay Process Co., Detroit, Mich — Jun. May 5, 1896; Assoc. M. Oct. 5, 1898; M. Sept. 6, 1904

GREENE, BENJAMIN DWIGHT. Stamford, Conn — Nov. 4, 1885

GREENE, DAVID MAXSON. Cons. Engr., 41 First St., Troy, N. Y. — May 20, 1868

GREENE, FRANCIS VINTON. Pres., The Niagara Constr. Co., Ltd., Ellicott Sq., Buffalo, N. Y. — June 3, 1885

GREENE, GEORGE SEARS, Jr. Cons. Engr., 11 Broadway, New York City — Dec. 4, 1867

GREGORY, LUTHER ELWOOD. Civ. Engr., U. S. N., Navy Yard, Portsmouth, N. H. — April 6, 1904

N. GREINER, JOHN EDWIN. Engr., Bridges and Bldgs., B. & O. R. R., Calvert Bldg., Baltimore, Md. — June 4, 1890

GRESHAM, ROBERT HALL. 124 Utica St., San Antonio, Tex. — May 4, 1898

GRIFFIN, EUGENE. First Vice-Pres., Gen. Elec. Co., 44 Broad St., New York City. — June 7, 1899

GRIGGS, JULIAN. Chf. Engr., Dept. of Public Service, Columbus, Ohio. — Oct. 4, 1899

GRIMES, EDWIN LINCOLN. Chf. Engr., Bureau of Water Supply, 47 State St., Troy, N. Y. — Mar. 2, 1904

GRIMM, CARL ROBERT. 1622 Caton Ave., Flatbush, Brooklyn, N. Y. — June 4, 1890

GRIMSHAW, JAMES WALTER. Australian Club, Sydney, New South Wales, Australia — Nov. 7, 1888

GRUNSKY, CARL EWALD. Isthmian Canal Commr., Evening Star Bldg., Washington, D. C — Oct. 5, 1898

GUILD, JOSEPHUS CONN. Chattanooga, Tenn. — June 1, 1898

GUNNELL, WILLIAM COVINGTON. 600 Twentieth St., N. W., Washington, D. C. — Feb. 7, 1877

GUPPY, BENJAMIN WILDER. Bridge Engr., Maine Cent. R. R. and Washington County Ry. Co., 238 St. John St., Portland, Me — Jun. June 19, 1891; Assoc. M. Oct. 3, 1894; M. Feb. 6, 1901

GUTHRIE, EDWARD BUCKINGHAM. Chf. Engr., Grade Crossing Comm. (Res., 158 North Pearl St.), Buffalo, N. Y. — Assoc. Sept. 3, 1884; M. Oct. 5, 1887

HAGUE, CHARLES ARTHUR. Hydr. Engr., 114 Liberty St., New York City. — Feb. 3, 1892

HAIGHT, STEPHEN SAMUEL. 1986 West Farms Rd. (Res., Buchanan Pl., University Heights), New York City. — June 1, 1881

	Date of Membership.	
HAINES, CASPAR WISTAR. Chf. Engr., R., F. & P. R. R. and Washington South. Ry., Richmond, Va	Jun.	Feb. 2, 1876
	M.	Oct. 7, 1891
HAINES, HENRY STEVENS. Cons. Engr., 374 Fifth Ave., New York City.		Nov. 2, 1887
HAINS, PETER CONOVER. Brig.-Gen., U. S. A., Stoneleigh Court, Washington, D. C.		April 2, 1890
HALE, RICHARD AUGUSTUS. Prin. Asst. Engr., Essex Co., Lawrence, Mass	Jun.	Feb. 6, 1884
	M.	July 1, 1891
HALL, BENJAMIN MORTIMER. Superv. Engr., Reclamation Service, U. S. Geological Survey, Carlsbad, N. Mex.		Feb. 6, 1901
HALL, HENRY ARTHUR. Asst. Engr., Met. Park Comm., 14 Beacon St., Boston, Mass.		May 7, 1902
HALL, JULIEN ASTIN. Cons. Engr., Wenonda, Pittsylvania Co., Va		June 5, 1889
N. HALL, WILLIAM HAMMOND. Cons.Engr., 324 Haight St., San Francisco, Cal.		Jan. 2, 1884
HALL, WILLIAM MCLAURINE. Citizens Guaranty Bldg., Parkersburg, W. Va		Dec. 6, 1893
HALLSTED, JAMES COTTLE. Cons. Engr., 66 Broadway, New York City.		Jan. 4, 1905
HAMBLETON, FRANCIS HENRY. Cons. Engr., Consolidated Gas Co., Baltimore, Md.		Mar. 5, 1873
HAMILTON, WILLIAM GASTON. 105 East 21st St., New York City		Oct. 7, 1868
HAMLIN, GEORGE HERBERT. Orono, Me.		July 3, 1895
HAMLIN, HOMER. U. S. Reclamation Service, Yuma, Ariz.		May 4, 1904
HAMMATT, EDWARD AUGUSTUS WHITE. Civ. and Hydr. Engr., 10 Neponset Blk., Hyde Park, Mass.		June 5, 1901
HAMMOND, ALONZO JOHN. City Engr., South Bend, Ind.		June 1, 1904
HANDBURY, THOMAS HENRY. Lt.-Col., Corps of Engrs., U. S. A., Room 92, Flood Bldg., San Francisco, Cal		Feb. 3, 1904
HANDY, EDWARD ADINO. Chf. Engr., L. S. & M. S. Ry. Co., Cleveland, Ohio		Jan. 2, 1889
HANNA, JOHN HUNTER. Asst. Chf. Engr. and Supt., Capital Traction Co., 36th and M. Sts., Washington, D. C.	Assoc. M.	April 3, 1901
	M.	Nov. 1, 1904
HANNA, JOHN VENABLE. Asst. Engr., M. of W., St. L. & S. F. R. R., Care, Frisco System, St. Louis, Mo.	Assoc. M.	May 3, 1893
	M.	April 2, 1902
HANSEL, CHARLES. V.-P. and G. M., Pneumatic Signal Co., Rochester, N. Y.		Oct. 3, 1894
HARAHAN, WILLIAM JOHNSON. Asst. Gen. Mgr., I. C. R. R., Chicago., Ill	Assoc. M.	Oct. 3, 1894
	M.	Oct. 7, 1903
HARDAWAY, BENJAMIN HURT. Contr. Engr., Columbus, Ga.		Oct. 7, 1903
HARDEE, WILLIAM JOSEPH. City Engr., Room 19, City Hall, New Orleans, La.		May 6, 1896
HARDING, GEORGE EDWARD. Civ. Engr. and Archt., 253 Broadway, New York City.		Mar. 3, 1875
HARDING, HENRY. Civ. and Hydr. Engr., Hartland (Fourcorners), Vt.		May 7, 1873
HARDY, EDWARD DANA. U. S. Asst. Engr., Office of Washington Aqueduct Filtration Plant, Washington, D. C.		Oct. 5, 1904
HARING, JAMES SMITH. Crafton, Allegheny Co., Pa.		Nov. 4, 1891

		Date of Membership.
HARLEY, ALFRED FRANCIS. Mandarin, Fla.		Dec. 7, 1898
HARLOW, GEORGE RICHARDSON. 204 Hawthorn St., Edgewood, Swissvale P. O., Pa.		Nov. 1, 1899
HARLOW, JAMES HAYWARD. Chf. Engr., Susquehanna Power Co., 2 Pleasant St., Baltimore, Md.		Mar. 4, 1874
HARRINGTON, EPHRAIM. Civ. and Cons. Engr., 60 State St., Boston, Mass.		Mar. 3, 1897
HARRINGTON, JOHN LYLE. Chf. Engr., Locomotive & Machine Co. of Montreal, Imperial Bank Bldg., Montreal, Que., Canada	Jun. Assoc. M. M.	Aug. 31, 1897 Oct. 4, 1899 Dec. 1, 1903
HARRIS, ELMO GOLIGHTLY. Prof. of Civ. Eng., Mo. School of Mines, Rolla, Mo.		Oct. 2, 1901
HARRIS, STEPHEN. 7215 Boyer St., Mt. Airy, Philadelphia, Pa.		June 4, 1902
HARRIS, VAN ALEN. Princeton, N. J.	Jun. Assoc. M. M.	Nov. 6, 1894 Oct. 5, 1898 Sept. 6, 1904
HARRISON, CHARLES LEWIS. Prin. Asst. Engr., P., N. Y. & L. I. R. R. Co., East River Div., 1 West 34th St., New York City.		Mar. 2, 1898
HARRISON, EDLOW WINGATE. Cons. Engr.; Chf. Engr., Jersey City Water Supply Co., 15 Exchange Pl., Jersey City, N. J.		June 3, 1885
HARROD, BENJAMIN MORGAN. (*Past-President*). Isthmian Canal Comm., Evening Star Bldg., Washington, D. C.		April 4, 1877
HARROUN, PHILIP EMBURY. Hydr. and Irrig. Engr., Berkeley, Cal.		Mar. 7, 1900
HARTRICK, EDWARD MACAULAY. U. S. Asst. Engr. in Chg. of River and Harbor Impvts., Galveston, Tex.		Feb. 1, 1899
R. HARTS, WILLIAM WRIGHT. Capt., Corps of Engrs., U. S. A.; California Debris Comm., Flood Bldg., San Francisco, Cal.	Assoc. M. M.	Oct. 2, 1895 April 6, 1898
HASBROUCK, CHARLES ALFRED. Asst. to Vice-Pres., Am. Bridge Co., 1315 Monadnock Blk., Chicago, Ill.	Assoc. M. M.	Feb. 3, 1892 Dec. 5, 1894
HASIE, MONTAGUE SYLVESTER. Pres., Texas Bridge Co., Dallas, Tex.		Feb. 3, 1897
HASKELL, EUGENE ELWIN. Prin. Asst. Engr., U. S. Lake Survey, Detroit, Mich.		Sept. 7, 1898
HASKINS, WILLIAM JEWETT. Cons. Engr., 32 Broadway, New York City.	Jun. M.	Mar. 7, 1883 Dec. 1, 1886
HASSKARL, JOSEPH FREDERICK. Const. Engr., U. S. Engr. Dept. (Res. 1603 Girard Ave.), Philadelphia, Pa.	Assoc. M. M.	Mar. 5, 1902 Nov. 1, 1904
HASWELL, CHARLES HAYNES. Civ. and Mech. Engr.; Asst. Engr., Board of Estimate and Apportionment, 324 West 78th St., New York City.		Jan. 29, 1868
HATCH, FREDERICK THOMAS. Chf. Engr., Vandalia R. R. Co., 815 Century Bldg., St. Louis, Mo.		Dec. 4, 1889
HATCH, JAMES NOBLE. Structural Engr. with Sargent & Lundy, 1720 Railway Exchange, Chicago, Ill.		Dec. 7, 1904
HATTON, THOMAS CHALKLEY. Cons. Engr., Wilmington, Del.		Mar. 6, 1895
HAUPT, LEWIS MUHLENBERG. Cons. Engr., 107 North 35th St., Philadelphia, Pa.		June 6, 1888

Date of Membership.

HAVEN, WILLIAM APPLETON. Inspecting Engr., Erie R. R., Room 10, Erie R. R. Depot, Buffalo, N. Y. — Mar. 5, 1873

HAVILAND, ARTHUR. Law Dept., N. Y. C. & H. R. R. R. Co., Grand Central Station, New York City. — Jun. Jan. 4, 1882; M. Jan. 4, 1888

HAWKS, JAMES DUDLEY. Pres., Detroit & Mackinac Ry. Co., Majestic Bldg., Detroit, Mich. — Dec. 3, 1884

HAWKSLEY, KENNETH PHIPSON. 30 Great George St., Westminster, London, England. — May 6, 1903

HAWLEY, JOHN BLACKSTOCK. City Engr., Fort Worth, Tex. — Assoc. M. May 1, 1895; M. Oct. 5, 1898

HAWLEY, WILLIAM CHAUNCEY. Chf. Engr. and Gen. Supt., Pennsylvania Water Co., 701 Wood St., Wilkinsburg, Pa. — Jun. Oct. 1, 1890; Assoc. M. April 6, 1892; M. Dec. 3, 1902

HAYDEN, WILLIAM WALLACE. Asst. Engr., Y. & M. V. R. R., 40 Spruce St., Memphis, Tenn — Nov. 6, 1895

HAYES, EDMUND. Ellicott Sq., Buffalo, N. Y. — Jun. April 3, 1878; M. Mar. 5, 1884

HAYES, EDWARD. 10 Imperial Ave., Cohoes, N. Y. — June 5, 1901

HAYES, GEORGE SAMUEL. 111 Fifth Ave., New York City. — Jun. Dec. 6, 1892; Assoc. M. June 3, 1896; M. Sept. 2, 1903

HAYES, HENRY WILDE. Div. Engr., B. & M. R. R., Boston, Mass. — Assoc. M. Mar. 2, 1898; M. May 1, 1901

HAYES, RICHARD SOMERS. 32 Nassau St., New York City. — Sept. 6, 1882

HAYES, STANLEY WOLCOTT. Engr. in Chg., R. A. & S. Ry. (for Westinghouse, Church, Kerr & Co.), Geneva, N. Y. — June 6, 1900

HAYS, JOHN WILLIS. 3 South Adams St., Petersburg, Va. — June 5, 1901

HAYT, STEPHEN THURSTON, Jr. Gen. Supt. and Chf. Engr., Susq. & N. Y. R. R., Towanda, Pa. — Mar. 3, 1897

HAZARD, SCHUYLER. Roadway Engr., Southern Ry. Co., 601 Woodward Bldg., Birmingham, Ala — Oct. 5, 1898

HAZELTON, CHARLES WILLIAM. Engr. and Treas., Turners Falls Co., Turners Falls, Mass. — Jan. 7, 1891

HAZEN, ALLEN. Cons. Engr., St. Paul Bldg., New York City. — Assoc. M. June 3, 1896; M. Mar. 6, 1900

HAZLEHURST, GEORGE BLAGDEN. Cons. Engr., Catonsville, Md. — Feb. 1, 1888

HAZLEHURST, JAMES NISBET. Chf. Engr., Board of Public Works, Mobile, Ala. — Oct. 4, 1899

HEALD, SIMPSON CLARK. Rockwood St., Jamaica Plain, Mass. — Nov. 4, 1885

HEALY, JOHN FRANCIS. Gen. Supt., Davis Coal & Coke Co., Thomas, W. Va. — Jun. Jan. 2, 1890; Assoc. M. June 3, 1891; M. Nov. 1, 1899

HEDRICK, IRA GRANT. (Waddell & Hedrick, Cons. Engrs.), 608 New Nelson Bldg., Kansas City, Mo. — Jun. Oct. 3, 1893; Assoc. M. June 2, 1897; M. Nov. 7, 1900

HEMMING, DUNKIN WIRGMAN. 502 West 143d St., New York City — Assoc. M. Sept. 7, 1892; M. May 31, 1904

Date of Membership.

HENDERER, WILLIAM OSWALD. Vice-Pres., The Osborn Eng. Co., Osborn Bldg., Cleveland, Ohio ..... April 3, 1901

HENDERSON, JOHN BAILLIE. Govt. Hydr. Engr., Brisbane, Queensland, Australia ..... June 4, 1890

HENDRICK, CALVIN WHEELER. Engr. of Sewers for Rapid Transit Comm., 10 Bridge St., New York City (Res., Englewood, N. J.). Nov. 7, 1900

HENNY, DAVID CHRISTIAAN. Cons. Engr., 1711 Central Ave., Alameda, Cal ..... Sept. 7, 1887

HENRY, DANIEL FARRAND. 52 Woodward Ave., Detroit, Mich ..... July 7, 1875

HEQUEMBOURG, CHARLES EZRA. 305 Central Ave., Dunkirk, N. Y. .... June 5, 1901

HERBERT, ARTHUR POWIS. Engr. and Supt., Colima Div., Mex. National Constr. Co., Colima, Mexico ..... Sept. 5, 1888

HERBERT, HARRY MONMOUTH. Cons. and Contr. Engr., Bound Brook, N. J ..... April 6, 1898

HERING, RUDOLPH. Hydr. and San. Engr., 170 Broadway, New York City ..... Jan. 5, 1876

HERMANN, EDWARD ADOLPH. Cons. Civ. Engr., 310 Security Bldg., St. Louis, Mo ..... April 6, 1887

HERMANY, CHARLES. (*Past-President*). Chf. Engr. and Supt., Water Co., 549 Third St., Louisville, Ky ..... Jan. 6, 1869

HERRICK, HENRY AUGUSTUS. Hydr. and Mill Engr., 242 Prospect St., Manchester, N. H ..... May 7, 1890

HERRON, JOHN. Mgr., The Tomboy Gold Mines Co., Ltd., Telluride, Colo. Oct. 4, 1893

R. HERSCHEL, CLEMENS. Hydr. Engr., 2 Wall St., New York City ..... April 21, 1869

HEUER, WILLIAM HENRY. Col., Corps of Engrs., U. S. A., 41 Flood Bldg., San Francisco, Cal ..... Mar. 3, 1880

HEWES, VIRGIL HENRY. With M. Lewinson & Co., 128 West 42d St., New York City ..... Feb. 3, 1904

HEWITT, CHARLES EDWARD. Gen. Mgr., The Trenton Iron Co., Trenton, N. J ..... Oct. 5, 1887

HICKOK, HENRY ADDISON. Mech. Engr., 762 Broad St., Newark, N. J. Oct. 7, 1896

HIDER, ARTHUR. U. S. Asst. Engr.; Res. Engr. in Local Chg. of Impvts., Lake Providence Reach, Mississippi River, Greenville, Miss. ..... Sept. 7, 1881

HILDENBRAND, WILHELM. 1 Broadway, New York City ..... Feb. 5, 1902

HILGARD, KARL EMIL. Cons. Civ. Engr.; Prof. of Civ. Eng., Federal Swiss Polytechnic Inst., 18 Steinwiesstrasse, Zurich, V., Switzerland ..... June 4, 1890

HILL, ALBERT BANKS. Cons. Civ. Engr., 100 Crown St., New Haven, Conn ..... Jun. Feb. 2, 1876; M. Mar. 5, 1884

HILL, GEORGE. Archt. and Cons. Engr., 100 Broadway, New York City ..... Assoc. M. Oct. 4, 1893; M. Feb. 1, 1899

HILL, JOHN WILLMUTH. Chf. Engr., Bureau of Filtration, 710 City Hall, Philadelphia, Pa ..... Jun. Feb. 3, 1875; M. April 5, 1876

HILL, WALTER HOVEY. Chf. Engr., Lewiston & S. E. Elec. Ry. Co., Lewiston, Idaho ..... June 5, 1901

	Date of Membership.
Hill, William Ryan. Cons. Engr., 242 Sixth Ave., Brooklyn, N. Y..	July 1, 1891
Hillyer, William Ross. Asst. Commr. of Public Works, Borough of Richmond, City of New York, Richmond Bldg., New Brighton (Res., 160 Richmond Ave., Port Richmond), N. Y.....	May 6, 1903
Hilton, George Porter. Vice-Pres., Hilton Bridge Constr. Co., Albany, N. Y.....	May 1, 1889
Himes, Albert James. Bridge Engr., N. Y. C. & St. L. R. R., 26 Warren Ave., Glenville, Ohio.....	Assoc. M. Nov. 6, 1895 M. June 7, 1899
Himmelwright, Abraham Lincoln Artman. Gen. Mgr., The Roebling Constr. Co., 949 Broadway, New York City.....	Oct. 5, 1898
Hinckley, Howard Vernon. Cons. Engr., Sulphur, Ind. T.....	Dec. 5, 1883
Hinckley, John Franklin. Chf. Engr., Frisco System, 915 Frisco Bldg., St. Louis, Mo.....	May 6, 1885
Hindes, Stetson George. Pacific Coast Mgr., Atlantic, Gulf & Pacific Co., 220 Market St., San Francisco, Cal.....	June 3, 1903
Hinds, Franklin Allen. Cons. Engr., 28 Flower Bldg., Watertown, N. Y.....	May 3, 1899
Hitchcock, Frederick Collamore. Care, Geo. S. Good & Co., Patton, Pa	Assoc. M. Mar. 7, 1894 M. Feb. 6, 1895
Hoag, Sidney Willett, Jr. Asst. Engr., Dept. of Docks and Ferries, New York City.....	Sept. 2, 1885
Hobson, Joseph. Chf. Engr.'s Office, Grand Trunk Ry. Co., Montreal, Que., Canada.....	Feb. 5, 1890
Hodgdon, Frank Wellington. Chf. Engr., Mass. Board, Harbor and Land Commrs., Room 131, State House, Boston, Mass.....	Dec. 3, 1884
Hodge, Harry Seymour. Vice-Pres., Detroit Twist Drill Co., 83 Alfred St., Detroit, Mich.....	Oct. 3, 1894
Hodge, Henry Wilson. Cons. Engr. (Boller & Hodge), 1 Nassau St., New York City.....	Jun. Jan. 5, 1887 M. Oct. 2, 1895
Hodges, Gilbert. Cons. Engr., 131 State St., Boston, Mass.....	June 4, 1890
Hodges, Harry Foote. Maj., Corps of Engrs., U. S. A., Room 116, War Dept., Washington, D. C.....	Mar. 4, 1903
Hoff, Olaf. Engr. of Structures, N. Y. C. & H. R. R. R., 505 Grand Central Station, New York City.....	May 6, 1885
Hoffman, Nathaniel Baker Klink. Asst. Engr., Dept. of Sewers (Res., 1 Nelson Ave.), Bronx, New York City.....	Nov. 6, 1901
Hoffmann, Robert. Asst. Chf. Engr., Dept. of Public Service, P. O. Box 180. Cleveland, Ohio	Assoc. M. June 5, 1901 M. Sept. 6, 1904
Hohl, Leonhard John. Mgr., Cherokee Gold Dredging Co., Oroville, Cal.....	Oct. 5, 1904
Holbrook, Elliot. La Jolla, San Diego Co., Cal.....	Sept. 3, 1902
Holbrook, Frederick William Doane. The Navy Yard, Puget Sound, Bremerton, Kitsap Co., Wash.....	Oct. 6, 1886
Holbrook, Henry Randolph. Pres., Laguna Canal Co., Pueblo, Colo..	Jan. 2, 1890
Holcombe, Joseph Gales. Prin. Asst. Engr., Bureau of Eng., Manila, Philippine Islands.....	May 4, 1904
Holgate, Henry. Cons. Engr. (Ross & Holgate), 78 St. Francois Xavier St., Montreal, Que., Canada.....	Oct. 2, 1901

Date of Membership.

HOLLYDAY, RICHARD CARMICHAEL. Civ. Engr., U. S. N., Navy Yard, Brooklyn, N. Y. ..... Sept. 2, 1903

HOLMAN, MINARD LAFEVER. (*Vice-President.*) Cons. Engr., (Holman & Laird), 3744 Finney Ave., St. Louis, Mo. ..... April 2, 1884

HOLMES, HOWARD CARLETON. Cons. Engr.; Chf. Engr., San Francisco Dry Dock Co., San Fran., Oakland & San Jose Ry. Co., Room 12, Ferry Bldg., San Francisco, Cal. ..... Nov. 4, 1903

HOLT, HERBERT SAMUEL. 297 Stanley St., Montreal, Que., Canada ... Mar. 6, 1889

HONENS, FREDERICK WILLIAM. Junior U. S. Engr., Sterling, Ill. ..... { Assoc. M. April 3, 1901 / M. May 31, 1904

HOOD, RICHARD HADEN. Care, R. H. Hood Co., 220 Broadway, New York City ..... { Assoc. M. May 3, 1893 / M. Nov. 2, 1898

HOOD, WILLIAM. Chf. Engr., S. P. Co., Merchants Exchange Bldg., San Francisco, Cal ..... Oct. 7, 1896

HOOK, CHARLES ADDISON. 400 East Madison St., Baltimore, Md. ..... Jan. 3, 1900

HOOK, GULIAN SCHMALZ. Civ. Engr., Gen. Elec. Co., Schenectady, N. Y. ..... April 3, 1901

HOOVER, JOSEPH WARREN. Bridge Engr., Gen. Agt., The Canton Bridge Co. of Canton, Ohio, 514 New York Life Bldg., Kansas City, Mo. ..... June 6, 1888

HOPKINS, CHARLES COMSTOCK. (Knight & Hopkins), Rome, N. Y. ..... June 4, 1890

HORN, FRANK CHURCHILL. Const. Engr., Reclamation Service, U. S. Geological Survey, Minidoka, Idaho ..... Sept. 1, 1903

HORTON, GEORGE TERRY. Engr. and Mgr., Chicago Bridge & Iron Works, 105th and Throop Sts., Chicago, Ill. ..... April 6, 1904

HORTON, HORACE E. Prop., Chicago Bridge & Iron Works, Chicago, Ill. ..... Sept. 6, 1882

HOTCHKISS, CHARLES WILCOX. Cons. Engr., 401 La Salle St. Station, Chicago, Ill. ..... Jan. 5, 1898

HOUGH, DAVID LEAVITT. Pres., The United Eng. & Contr. Co., 13 Park Row, New York City ..... May 5, 1897

HOUGH, ULYSSES B. Civ. and Mech. Engr., 308 Hyde Blk., Spokane, Wash. ..... Nov. 5, 1902

HOUSE, FRANCIS EDWIN. Pres., D. & I. R. R. R. Co., Duluth, Minn. . May 1, 1895

HOVEY, OTIS ELLIS. Engr. of Design, Am. Bridge Co., 100 Broadway, New York City ..... { Assoc. M. April 4, 1894 / M. Jan. 3, 1900

HOWARD, FREDERICK BILLINGS. Grosse Ile, Wayne Co., Mich. . { Jun. Mar. 3, 1875 / M. Nov. 6, 1878

HOWARD, JOHN LEWIS. Div. Engr., Charles River Basin Comm., 367 Boylston St., Boston, Mass. ..... { Assoc. M. Dec. 7, 1898 / M. April 2, 1902

HOWE, EDWARD WILLARD. Asst. Engr., Eng. Dept., 65 City Hall, Boston, Mass. ..... Sept. 7, 1887

HOWE, HORACE JOSEPH. Asst. Engr., Rapid Transit R. R. Commrs., 231 West 125th St., New York City ..... { Jun. May 2, 1888 / M. Mar. 2, 1898

HOWE, MALVERD ABIJAH. Prof., Civ. Eng., Rose Polytechnic Inst. (Res., 2108 North 10th St.), Terre Haute, Ind. .... { Assoc. May 7, 1890 / M. Jan. 1, 1896

HOWE, WILLIAM BELL WHITE. Cons. Engr., Spartanburg, S. C. ..... Mar. 1, 1893

		Date of Membership.
	HOWELL, DAVID JANNEY. 605 Twelfth St., N. W., Washington, D. C...	Sept. 5, 1900
	HOWELL, FRANKLIN DAVINPORT, Jr. P. O. Box 308, Monrovia, Cal.....	June 5, 1901
	HOWELLS, JULIUS MERRIAM. Cons. Hydr. Engr., 836 Mills Bldg., San Francisco, Cal.....	June 4, 1902
	HOXIE, RICHARD LEVERIDGE. Lt.-Col., Corps of Engrs., U. S. A., 812 St. Paul St., Baltimore, Md.....	June 2, 1886
	HOYT, WILLIAM EDWIN. Cons. Engr., and Asst. Engr., N. Y. C. & H. R. R. R. Co. (Res., 50 Westminster Rd.), Rochester, N. Y.....	Mar. 5, 1884
N.	HUBBELL, CLARENCE WILLIAM. Civ. Engr. to Board of Water Commrs., 232 Jefferson Ave., Detroit, Mich..	Jun. May 31, 1898 Assoc. M. April 4, 1900 M. Jan. 5, 1904
	HUDSON, CLARENCE WALTER. Asst. Engr., Phœnix Bridge Co., Phœnixville, Pa.....	Assoc. M. Nov. 7, 1894 M. Feb. 7, 1900
	HUDSON, JOHN ROGERS. 1806 Locust St., St. Louis, Mo.....	May 4, 1887
	HUGHES, WILLIAM MACKENZIE. Cons. Bridge Engr., 400 La Salle St. Station, Chicago, Ill.....	June 2, 1880
	HUMPHREY, RICHARD LEWIS. Cons. Engr., 1001 Harrison Bldg., Philadelphia, Pa.....	Assoc. M. May 5, 1897 M. May 3, 1904
	HUMPHREYS, ALEXANDER CROMBIE. (Humphreys & Glasgow), 31 Nassau St., New York City; Pres., Buffalo Gas Co. and Stevens Inst. of Tech.....	Mar. 6, 1895
	HUMPHREYS, CHARLES. Asst. Engr., U. S. Engr. Dept., 47 Fifteenth St., Wheeling, W. Va.....	Feb. 1, 1905
	HUMPHREYS, DAVID CARLISLE. Dean, Prof., of Civ. Eng., Washington and Lee Univ., Lexington, Va.....	Nov. 2, 1887
	HUNT, CHARLES WARREN. (*Secretary*). 220 West 57th St. (Res., 171 West 88th St.), New York City.....	Jan. 2, 1884
	HUNT, CONWAY BETHUNE. Engr. of Highways, District of Columbia, District Bldg. (Res., 1815 M St., N. W.), Washington, D. C...	Feb. 4, 1891
	HUNT, ROBERT WOOLSTON. Robert W. Hunt & Co., 1121 The Rookery, Chicago, Ill.....	June 3, 1885
	HUNT, RUFUS CAMERON. Mgr., Sections 13 and 14, Rapid Transit Subway, 187th St. and Broadway (Res., 220 West 107th St), New York City.....	Oct. 5, 1904
	HUNTER, WILLIAM. Chf. Engr., P. & R. Ry., Philadelphia, Pa.....	June 5, 1895
	HURRY, EDWARD HENRY. Goodwyns, Haslemere, England.....	June 1, 1898
	HUTCHINGS, WILLIAM EVELYN. Asst. Engr., L. & N. R. R. Co., 1578 Barrett Ave., Louisville, Ky.....	June 7, 1899
	HUTCHINS, JERE CHAMBERLAIN. Pres., Detroit United Ry., 12 Woodward Ave., Detroit, Mich.....	Assoc. M. Mar. 2, 1898 M. April 4, 1900
	HUTCHINSON, CARY TALCOTT. Cons. Elec. Engr., 56 Pine St., New York City.....	Assoc. M. Mar. 4, 1896 M. Mar. 1, 1904
	HUTCHINSON, GEORGE HUNT. Chf. Engr., North Western Fuel Co., Pioneer Press Bldg., St. Paul, Minn.....	Assoc. M. Sept. 2, 1891 M. June 7, 1893
	HUTTON, NATHANIEL HENRY. Harbor Engr.; Pres., Harbor Board, City Hall, Baltimore, Md.....	June 3, 1896
	HYDE, ABRAHAM LINCOLN. Asst. Prof. Civ. Eng., Univ. of Missouri, Univ. Club, Columbia, Mo.....	Assoc. M. April 5, 1893 M. Oct. 6, 1897

		Date of Membership.
Ingalls, Owen Lovejoy. Engr. in Chg. of Manila Sewerage System, Manila, Philippine Islands	Jun.	Mar. 5, 1890
	M.	June 4, 1902
Ingersoll, Colin Macrae, Jr. Chf. Engr., N. Y., N. H. & H. R. R., New Haven, Conn		June 5, 1895
Irwin, James Clark. Care of 5th Vice-Pres., N. Y. C. & H. R. R. R., Grand Central Station, New York City	Jun.	April 4, 1893
	Assoc. M.	Dec. 7, 1898
	M.	June 6, 1900
Isaacs, John Dove. Engr. of Bridges, S. P. Co.; Asst. Engr., M. of W., Pacific System and Lines in Oregon, S. P. Co., Room 1316, Merchants Exchange Bldg., San Francisco, Cal		Mar. 7, 1894
Ives, Arthur Stanley. Asst. Mgr., Glamorgan Pipe & Foundry Co., Lynchburg, Va	Jun.	Jan. 7, 1896
	Assoc. M.	Jan. 3, 1900
	M.	May 7, 1902
Jackman, Howard Hill. 2177 Washington Boulevard, Chicago, Ill		May 6, 1891
Jackson, Dugald Caleb. Prof. of Elec. Eng., Univ. of Wisconsin; Cons. Engr., Madison, Wis		Nov. 2, 1898
Jackson, Jones Mumford. Cons. Engr., 32 Washington Ave., Schenectady, N. Y		Sept. 1, 1886
Jackson, Thomas Moore. Pres., West Va. Short Line R. R., Clarksburg, W. Va		June 3, 1891
Jackson, William. City Engr., 50 City Hall, Boston, Mass		Sept. 3, 1884
Jackson, William Benjamin. Cons. Engr., Madison, Wis		Mar. 4, 1903
Jacobs, Charles Mattathias. 128 Broadway, New York City		May 4, 1904
Jacomb-Hood, John Wykeham. Chf. Engr., Lond. & S. W. Ry., Engr.'s Office, Waterloo Station, London, S. E., England		Feb. 5, 1902
Jameson, Charles Davis. Gen. Mgr., Jameson & Co., Tientsin, China		Mar. 7, 1888
Jamieson, John Quintin. 475 Hassalo St., Portland, Ore		Nov. 6, 1889
Janney, William Dean. Chf. Engr., Elk River Coal & Lumber Assoc., Clay, Clay Co., W. Va		April 1, 1896
Jaques, William Henry. Engr. and Naval Archt., Little Boar's Head, N. H		July 2, 1890
Jardine, Alexander William. Brisbane, Queensland, Australia		April 2, 1890
Jarvis, Charles Maples. First Vice-Pres., Am. Hardware Corporation, New Britain, Conn		Jan. 7, 1885
Jaycox, Thomas William. Deputy State Engr., Denver, Colo		Jan. 4, 1882
Jenkins, William Dunbar. Res. Engr.-in-Chg., Mo. Pac., Arkansas and White River Bridges, Arkansas City, Ark		Sept. 7, 1887
Jennings, William Tyndale. Cons. Engr., 48 King St., West, Toronto, Ont., Canada		April 2, 1884
Jewett, William Cornell. Res. Engr., Commrs. of Water-Works (Res., 541 Ridgeway Ave.), Cincinnati, Ohio		June 3, 1885
Johnson, Albert Lincoln. Chf. Engr., St. Louis Expanded Metal Fire-proofing Co., 606 Century Bldg., St. Louis, Mo.	Assoc. M.	Sept. 2, 1896
	M.	Dec. 4, 1901
Johnson, Chapman Love. Cons. Engr., 238 Mary St., Utica, N. Y		Oct. 7, 1903
Johnson, Francis Robert. Vernow, B. C., Canada		June 1, 1898

Date of Membership.

JOHNSON, JAMES MORELAND. Engr. and Pres., Louisville Bridge & Iron Co., Louisville, Ky. .. July 1, 1891

JOHNSON, LEWIS ELISHA. Engr. of Constr., Bridge Dept., Pennsylvania Steel Co., Steelton, Pa. { Assoc. M. Nov. 4, 1896 / M. May 1, 1901

JOHNSON, LEWIS JEROME. Asst. Prof. of Civ. Eng., Harvard Univ., and Cons. Engr., 309 Pierce Hall, Cambridge, Mass. { Assoc. M. Sept. 4, 1901 / M. Nov. 1, 1904

JOHNSON, LUCIEN SAMUEL. Supt., Aetna Constr. Co., Dam 11, Ohio River, Wellsburg, W. Va. .... Dec. 4, 1901

JOHNSON, PHELPS. Mgr., Dominion Bridge Co., Ltd., Windsor Hotel, Montreal, Que., Canada .... July 1, 1891

JOHNSON, THOMAS H. Cons. Engr., Penn. Lines W. of Pitts., Pittsburg, Pa. .... Sept. 5, 1877

JOHNSON, WALLACE CLYDE. Commr. of River Impvt., State of N. Y.; Chf. Engr., Shawinigan Water & Power Co., Montreal; Cons. Engr., Niagara Falls Hydr. Power & Mfg. Co., Niagara Falls, N. Y. .... Oct. 5, 1892

JOHNSTON, ALBERT WILLIAM. Gen. Supt., N. Y., C. & St. L. R. R., 424 Hickox Bldg., Cleveland, Ohio .... Mar. 6, 1895

JOHNSTON, CLARENCE THOMAS. State Engr., Cheyenne, Wyo. .... Sept. 7, 1904

JOHNSTON, HORACE GREELEY. Mgr., Am. Well & Prospecting Co., Corsicana, Tex. .... Sept. 7, 1887

JOHNSTON, JOHN HOWARD. Care, Backus & Johnston, Lima, Peru. .... Mar. 1, 1876

JONAH, FRANK GILBERT. Care, J. F. Hinckley, Chf. Engr., Frisco System, Frisco Bldg., St. Louis, Mo. .... Nov. 4, 1903

JONES, WASHINGTON. Mech. Engr., 1632 North 15th St., Philadelphia, Pa. .... Oct. 7, 1874

JONES, WILLIAM HENRY. Prin. Asst. Engr., Mo. Valley Bridge & Iron Co., 315 Vine St., Leavenworth, Kans. .... May 4, 1904

JORDAN, EDWARD CLARENCE. Civ. and Hydr. Engr., 31½ Exchange St., Portland, Me. .... May 7, 1890

JUDSON, CHARLES ALBERT. Collector of Customs, Sandusky, Ohio. .... Jan. 3, 1894

JUDSON, WILLIAM PIERSON. Cons. Engr., Oswego, N. Y. .... Sept. 7, 1881

JUDSON, WILLIAM VOORHEES. Capt., Corps of Engrs., U. S. A., Office of the Chf. of Engrs., Washington, D. C. .... Nov. 4, 1896

JUENGST, HENRY FREDERICK. Care, City Water Co., East St. Louis, Ill. .... April 2, 1884

JUST, GEORGE ALEXANDER. Cons. Engr., 452 Fifth Ave., New York City { Jun. Sept. 3, 1884 / M. Mar. 4, 1891

KADONO, CHOKURO. Engr. and Mgr., Okura & Co , 53 New Broad St., London, E. C., England. .... Jan. 8, 1902

KAREISCHA, SERGE DE. Prof. of the Imperial Inst. of Engrs. of Ways and Communications; Asst. Gen. Mgr., Traffic Dept., Board of Direction, Russian Rys.; Pres., Assoc. of M. of W. Engrs., Russian Ry., Zagorodny prosp. No. 70, log 4, St. Petersburg, Russia. June 6, 1894

KASTL, ALEXANDER EDWARD. Cons. Engr., Reclamation Service, U. S. Geological Survey, 973 Clarkson St., Denver, Colo. { Jun. Jan. 4, 1888 / M. Nov. 5, 1890

Date of Membership.

KATTE, WALTER. Cons. Engr., Irvington, N. Y. ..... Oct. 7, 1868

KAUFMAN, GUSTAVE. Engr. and Mgr., The Wilson & Baillie Mfg. Co., 26 Court St., Brooklyn, N. Y. ..... May 7, 1890

KEATING, EDWARD HENRY. Mgr., Toronto Ry. Co., Toronto, Ont., Canada ..... June 7, 1882

KEEFER, GEORGE ALEXANDER. Res. Engr., Dominion Public Works in B. C., New Westminster, B. C., Canada ..... Jan. 2, 1889

KEEFER, THOMAS COLTRIN. (*Past-President*). Ottawa, Ont., Canada ..... April 4, 1877

KEENE, WILLIAM FAITOUTE. City Engr., Central Falls, R. I. ..... { Assoc. M. June 3, 1896 / M. May 1, 1901

KEITH, GEORGE THOMAS. Res. Engr., Barge Canal, Lincoln Park, Monroe Co., N. Y. ..... May 4, 1881

KEITH, HERBERT CARY. Cons. Engr., 303 East 12th St., Brooklyn, N. Y. ..... Dec. 4, 1889

KELLER, CHARLES. Capt., Corps of Engrs., U. S. A., Engr. Officer, Dept. of Mindanao, and Engr., Moro Province, Zamboanga, Mindanao, Philippine Islands. ..... Mar. 7, 1900

KELLEY, HOWARD GEORGE. Chf. Engr., Minn. & St. L. R. R., Iowa Cent. Ry., 1133 Guaranty Bldg., Minneapolis, Minn ..... May 1, 1889

KELLEY, WILLIAM DATUS. Engr., Bldr. and Contr. (Kelly & Kelley), 45 East 42d St., New York City ..... Nov. 2, 1887

KELLOGG, CHARLES. Pres., Imperial Pneumatic Tool Co., Athens, Pa. . June 2, 1880

KELLOGG, NORMAN BENJAMIN. 508 California St., San Francisco, Cal. ..... { Jun. Feb. 6, 1878 / M. July 3, 1895

KELLY, CASSIUS WILLIAM. City Engr., 17 City Hall, New Haven, Conn ..... { Jun. Mar. 1, 1882 / M. June 6, 1888

KENDRICK, JOHN WILLIAM. Third Vice-Pres., A., T. & S. F. Ry., Railway Exchange, Chicago, Ill. ..... June 6, 1883

KENDRICK, JULIAN WAY. City Engr., Birmingham, Ala., and Chf. Engr., Jefferson Co. (Ala.) San. Comm ..... Oct. 1, 1902

KENLY, EDWARD MARION. Engr. and Supt., Gorman Coal and Coke Co., Austen, Preston Co., W. Va ..... May 4, 1904

KENLY, WILLIAM LACY. Lake Montebello, Baltimore, Md ..... Nov. 7, 1894

KENLY, WILLIAM WATKINS. Treas. and Gen. Mgr., U. S. Mortar Supply Co., 1123 Broadway, New York City ..... Nov. 6, 1889

KENNEDY, JAMES HENRY. Chf. Engr., Vancouver, Victoria & East. Ry. & Nav. Co., Grand Forks, B. C., Canada ..... May 2, 1900

KENNEDY, JEREMIAH JOSEPH. Cons. Engr., 52 Broadway, New York City. June 4, 1902

KENNEDY, JOHN. Chf. Engr., Harbor Commrs., Montreal, Que., Canada ..... Sept. 1, 1875

KENNEDY, WILLIAM HARLIN. Chf. Engr., The Ore. R. R. & Nav. Co., Portland, Ore. ..... Sept. 6, 1871

KERNOT, WILLIAM CHARLES. Prof. of Eng., Univ. of Melbourne, Melbourne, Victoria, Australia ..... Mar. 6, 1889

KERR, FRANK MONTGOMERY. Chf. State Engr. of Louisiana, Room 402, Cotton Exchange Bldg., New Orleans, La ..... Oct. 2, 1901

KERR, LUTHER YAGER. U. S. Junior Engr., Box 204, Memphis, Tenn. June 4, 1902

Date of Membership.

KHUEN, RICHARD. Res. Engr., Am. Bridge Co., Ambridge, Pa. — Jun. Dec. 3, 1891; Assoc. M. May 1, 1895; M. Nov. 2, 1898

KIELLAND, SOREN THEODOR MUNCH BULL. Civ. Engr., Buffalo Creek R. R.; Office, 364 Ellicott Sq., Buffalo, N. Y. — Feb. 6, 1889

KIERSTED, WYNKOOP. Cons. Engr., 58 Water-Works Bldg., Kansas City, Mo. — Oct. 5, 1887

KIMBALL, FRANK CLIFTON. Civ. and Hydr. Engr., 14 Beacon St., Boston, Mass — June 3, 1903

KIMBALL, GEORGE ALBERT. Chf. Engr., Elev. Cons. Boston Elev. Ry. Co., 101 Milk St., Boston, Mass — Jun. May 12, 1875; M. July 1, 1891

KIMBALL, GEORGE HENRY. Chf. Engr., Chic. & Alton Ry., Railway Exchange Bldg., Chicago, Ill. (Res., 72 Delaware Ave., Detroit, Mich.) — Dec. 3, 1890

KINDER, CLAUDE WILLIAM. Engr. in Chf. and Supt., Imperial Chinese Rys., Tientsin, China — June 4, 1890

KING, CHARLES CYRUS. Chf. Engr., C. W. Hunt Co., West New Brighton, Richmond Co., N. Y. — Sept. 2, 1891

KING, PAUL SOURIN. Cons. Engr., 120 Broadway, Lock Box 513, New York City — July 3, 1889

KING, WILLIAM BYRD. Gen. Mgr., Fort Worth Stock Yards Co. and Fort Worth Belt Ry. Co., Fort Worth, Tex. — Oct. 7, 1896

KING, WINFIELD SCOTT. Chf. Engr. and Supt., Motive Power, Union Stock Yards & R. R. Co., South Omaha, Nebr. — Dec. 6, 1899

KINGMAN, LEWIS. Chf. Engr., Mex. Cent. Ry., City of Mexico, D. F., Mexico — July 1, 1885

KINGSLEY, MARVIN WATSON. Civ. and Hydr. Engr., 2646 Euclid Ave., Cleveland, Ohio — July 3, 1878

KINNEY, EDWARD CORNELIUS. Gen. Mgr., West Gallatin Irrig. Co., Bozeman, Mont — May 3, 1882

KINSLEY, THOMAS PEARSON. Broadway and 187th St., New York City. — Feb. 5, 1873

KIRKPATRICK, WALTER GILL. (Kirkpatrick & Johnson), Jackson, Miss. — Assoc. M. April 6, 1892; M. Oct. 5, 1898

KITTREDGE, GEORGE WATSON. Chf. Engr. of The C., C., C. & St. L. Ry. Co., Cincinnati, Ohio — Jan. 6, 1886

KITTRELL, JAMES WESSON. Smith's Landing, Greene Co., N. Y. — Sept. 1, 1897

KLAPP, EUGENE. Cons. Engr., Brooklyn Rapid Transit Co., 168 Montague St., Brooklyn, N. Y. — Feb. 6, 1901

KLEINBECK, AUGUST GUSTAVE. 710 North State St., Litchfield, Ill — Feb. 3, 1897

KLUEGEL, CHARLES HENRY. Chf. Engr., Oahu Ry. & Land Co., P. O. Box 796, Honolulu, Hawaii — Oct. 1, 1902

KNAP, JOSEPH MOSS. (*Treasurer*). 220 West 57th St., New York City — April 5, 1882

KNAPP, HERMANN MERIWETHER. Contr. Mgr., Am. Bridge Co. of New York, Union Trust Bldg., Cincinnati, Ohio — Assoc. M. May 6, 1903; M. Jan. 31, 1905

KNAPP, LOUIS HENRY. Civ. and Hydr. Engr., 280 Linwood Ave., Buffalo, N. Y. — Mar. 4, 1874

Date of Membership.

KNICKERBACKER, JOHN. Pres., Eddy Valve Co., Waterford, N. Y..... Jan. 2, 1900

KNICKERBOCKER, CURTIS EDWIN. Engr., M. of W., N. Y., O. & W. Ry. Co., Middletown, N. Y..... Feb. 1, 1905

KNIGHT, WALTER HARRIS. International Power Co., Providence, R. I. Feb. 1, 1893

KNIGHTON, JOHN ALBERT. Asst. Engr., Manhattan Bridge, Bridge Dept., Park Row Bldg., New York City..... Jan. 4, 1905

KNOWLES, MORRIS. Chf. Engr., Bureau of Filtration, Pittsburg; also Civ. and Cons. Engr. (Chapin & Knowles), 1017 Frick Bldg., Pittsburg, Pa..... Jun. Oct. 4, 1892; Assoc. M. Jan. 1, 1896; M. April 1, 1903

KONDO, SENTARO. Doboku Kantokusho, Tokyo, Japan..... Nov. 7, 1900

KONDO, TORAGORO. Chf. Engr., Home Dept., Tokyo, Japan.... Jun. Oct. 3, 1888; M. June 5, 1901

KOPS, JULIAN DE BRUYN. Civ. Engr. and Archt., 18 Board of Trade Bldg., Savannah, Ga..... Assoc. M. April 4, 1894; M. Jan. 5, 1904

KOWER, HERMANN. Univ. of California, Berkeley, Cal..... Oct. 5, 1904

KUERSTEINER, EMIL EDWARD. Asst. Engr., L. & N. R. R., 1954 Floyd St., Louisville, Ky..... Dec. 1, 1897

KUICHLING, EMIL. (*Vice-President*). Cons. Engr., 52 Broadway, New York City..... Sept. 3, 1884

KUNZ, FREDERIC CHARLES. Engr. of Constr., Bridge Dept., Pennsylvania Steel Co., Steelton, Pa..... Assoc. M. Feb. 6, 1895; M. Dec. 7, 1898

KUTZ, CHARLES WILLAUER. Capt., Corps of Engrs, U. S. A., 2117 O St., N. W., Washington, D. C..... May 7, 1902

LABELLE, HENRY FRANCIS. Civ. and Hydr. Engr., 1109 Betz Bldg., Philadelphia, Pa..... April 6, 1898

LA CHICOTTE, HENRY ARTHUR. Engr. in Chg. Manhattan Bridge (No. 3) and Blackwell's Island Bridge (No. 4), Dept. of Bridges, New York City..... Oct. 3, 1894

LAFORGE, FREDERICK WILLIAM. Junior Engr., U. S. Engr. Dept., Ft. Terry, N. Y..... Oct. 5, 1904

LAMB, RICHARD. Cons., Civ., Elec. and Min. Engr., 136 Liberty St., New York City..... Assoc. M. May 6, 1891; M. June 6, 1900

LANDON, EUGENE ASHBEL Vice-Pres. and Mgr., Groton Bridge Co., Groton, Tompkins Co., N. Y..... April 1, 1896

LANDOR, EDWARD JOHN. Civ. and Contr. Engr., 1244 N. Cleveland Ave., Canton, Ohio..... Mar. 7, 1888

LANDRETH, OLIN HENRY. Prof. of Eng., Union Coll.; Cons. Engr., Schenectady, N. Y..... Sept. 3, 1884

LANDRETH, WILLIAM BARKER. (*Director*). Res. Engr., Eastern Div., New York State Canals, State Hall, Albany, N. Y..... Oct. 3, 1888

LANG, OTTO HEINRICH. Asst. Engr., Tex. & Pac. Ry., Dallas, Tex... Oct. 5, 1904

LANGE, GUNARDO AUFIN. Care, Fr. J. Morison, Casilla de Correa No. 1098, Buenos Aires, Argentine Republic..... Mar. 3, 1897

LANGTON, JOHN. 99 John St., New York City..... May 2, 1900

LANSING, EDWARD TEN EYCK. Little Falls, N. Y..... Sept. 3, 1902

LARRABEE, WILLIAM DOMINICK. Supt. and Chf. Engr., Los Angeles Pacific R. R. Co., 316 West 4th St., Los Angeles, Cal..... Oct. 5, 1904

Date of Membership.

LARSSON, CARL GUSTAF EMIL. Asst. Chf. Engr., Am. Bridge Co., Ambridge, Pa. ..... April 1, 1903

LAUB, HERMANN. 610 Lewis Blk., Pittsburg, Pa. ..... Sept. 1, 1897

LAWLOR, FRANCIS DENIS HUBERT. Citizens Water Co., Burlington, Iowa ..... Jun. Oct. 6, 1886; M. Mar. 6, 1895

LAWTON, WILLIAM HENRY. City Engr., Newport, R. I. ..... June 2, 1886

LEA, SAMUEL HILL. Cons. Engr., Sturgis, S. Dak. ..... Nov. 3, 1897

LEAVITT, ERASMUS DARWIN. Cons. Engr., 317 Harvard St., Station A, Cambridge, Mass. ..... July 2, 1873

LEAVITT, FRANK MCDOWELL. Mech. Engr., 258 Broadway, New York City ..... Dec. 2, 1885

LE BARON, JOHN FRANCIS. Cons. Engr.; Pres. and Gen. Mgr., Moccasin Falls Ginseng Co., 712 Park Bldg., Cleveland (Res., Chardon), Ohio ..... June 7, 1882

LE CONTE, LOUIS JULIAN. U. S. Asst. Engr. in Chg., Oakland Harbor Works (P. O. Box 482), Oakland, Cal. ..... April 4, 1877

LEDERLE, GEORGE ANTHONY. Civ. Engr. and Contr., 171 La Salle St., Chicago, Ill. ..... Jun. May 2, 1883; M. Oct. 6, 1886

LEDLIE, CHARLES HEES. Cons. Engr., 918 Rialto Bldg., St. Louis, Mo. Jan. 4, 1888

LEDOUX, JOHN WALTER. Chf. Engr. of The Am. Pipe Mfg. Co., 112 North Broad St., Philadelphia, Pa. ..... June 5, 1895

LEE, EDWARD HERVEY. Engr. and Gen. Roadmaster, Chic. & W. Indiana R. R. and Belt Ry. of Chicago, Room 45, Dearborn Station, Chicago, Ill. ..... June 6, 1900

LEE, WELLINGTON BARNES. Sales Agt., Ramapo Iron Works, Hillburn, N. Y. ..... Assoc. M. Feb. 5, 1896; M. May 4, 1898

LEFFINGWELL, WILLIAM HOWLAND. 220 Crocker Bldg., San Francisco, Cal. ..... Oct. 4, 1893

LEHLBACH, GUSTAV. 196 Market St., Newark, N. J. ..... Mar. 7, 1883

LEHNARTZ, FREDERICK WILLIAM. U. S. Asst. Engr., U. S. Engr. Office, Grand Rapids, Mich. ..... Aug. 6, 1879

LEISEN, THEODORE ALFRED. Cons. Engr.; Chf. Engr., Water Dept., Wilmington, Del. ..... June 2, 1897

LELAND, GEORGE HERBERT. 930 Banigan Bldg., Providence, R. I. ..... Jun. Mar. 2, 1887; M. Feb. 1, 1893

LELAND, WARREN ALLSTON. U. S. Asst. Engr., Moultrieville, S. C. .... Oct. 3, 1900

LEONARD, HENRY READ. Engr. of Bridges, P. R. R. Co., 660 Broad St. Station, Philadelphia, Pa. ..... April 4, 1894

LEVERICH, GABRIEL. 373 Stuyvesant Ave., Brooklyn, N. Y. ..... July 6, 1870

LEWINSON, MAXYMILIAN. 128 West 42d St., New York City. ..... Feb. 7, 1894

LEWIS, EUGENE CASTNER. (*Director*). Gen. Mgr., Sycamore Powder Mills; Pres., L. & N. Terminal Co., Nashville, Tenn. .... Mar. 5, 1873

LEWIS, EVERETT WILSON. Asst. Engr., N. P. Ry., St. Paul, Minn. .... Sept. 4, 1901

LEWIS, FREDERICK HUMPHREVILLE. Cons. Engr., Echols Bldg., Staunton, Va ..... Jan. 6, 1897

LEWIS, NELSON PETER. (*Director*). Chf. Engr., Board of Estimate and Apportionment, 277 Broadway, New York City. ..... Oct. 2, 1895

Date of Membership.

LEWIS, SIDNEY FRANCIS. Mem. of the Board of State Engrs. of La., Room 402, Cotton Exchange Bldg., New Orleans, La. ..... May 4, 1881

LIEB, JOHN WILLIAM, Jr. Third Vice-Pres. and Assoc. Gen. Mgr., The New York Edison Co., 55 Duane St. (Res., 869 West End Ave.), New York City ..... Oct. 5, 1898

LILLY, GEORGE WASHINGTON. Asst. Engr., Dept. of Public Service, Columbus, Ohio ..... Assoc. M. April 2, 1902; M. Jan. 31, 1905

R. LINDENTHAL, GUSTAV. 45 Cedar St., New York City ..... May 3, 1882

LINTON, HARVEY. City Engr., Altoona, Pa. ..... Oct. 5, 1892

LINVILLE, JACOB HAYS. Cons. Engr., 817 South 48th St., Philadelphia, Pa. ..... Mar. 3, 1875

LIPPINCOTT, JOSEPH BARLOW. Superv. Engr., U. S. Geological Survey, Los Angeles, Cal. ..... Dec. 6, 1899

LIST, CHARLES. Res. Engr., I. C. C., Cristobal, Canal Zone, Panama. June 3, 1903

LLEWELLYN, FRANCIS JOHN. Contr. Mgr., Am. Bridge Co. of N.Y., Monadnock Blk., Chicago, Ill. ..... Nov. 4, 1896

LOCKE, CHARLES ABBOTT. 1518 McGavock St., Nashville, Tenn. ..... Oct. 3, 1888

LOCKE, FRANKLIN BUCHANAN. City Engr., North Adams, Mass. ..... Mar. 1, 1893

LOCKWOOD, JAMES BUTTON CLYDE. Cons. Engr., 661 Worcester Bldg., Portland, Ore. ..... Mar. 6, 1901

LOCKWOOD, JUDD ALLEN. Asst. Engr., Dept. of Bridges, 600 Lenox Ave., New York City ..... April 4, 1899

LOFLAND, HENRY FIDDEMAN. Mgr., Eastern Div., Erecting Dept., Am. Bridge Co. of N. Y., Philadelphia, Pa. ..... June 2, 1897

LONG, THOMAS JOHN. Vice-Pres., Atlantic, Gulf & Pacific Co., Civ. Engrs. and Contrs., Park Row Bldg., New York City. Jun. Nov. 3, 1875; M. Jan. 7, 1880

LOOMIS, HORACE. Chf. Engr. of Sewers, Borough of Manhattan, 13 Park Row, New York City ..... Nov. 5, 1879

LOOMIS, THOMAS HOOKER. Chf. Engr., Steubenville & Canton Ry., Steubenville, Ohio ..... Jan. 7, 1903

LOREE, LEONOR FRESNEL. Care, Hoffman House, New York City ..... Oct. 6, 1886

LOVELL, WALTER DANVILLE. 1415 Eighth St., S. E., Minneapolis, Minn ..... May 4, 1904

N. LOW, EMILE. Res. Engr., State of New York, Constr. of Barge Canal, Rome, N. Y. ..... May 2, 1888

LOWE, JESSE. (Christie & Lowe, Civ. Engrs. and Contrs.), 171 La Salle St., Chicago, Ill. ..... Oct. 2, 1895

LOWETH, CHARLES FREDERICK. Engr. and Supt., Bridges and Bldgs., C., M. & St. P. Ry., 1232 Railway Exchange, Chicago, Ill. ..... Jun. Jan. 3, 1883; M. Feb. 6, 1884

LOWRIE, HARVEY CHILDS. Pres., The Lowrie Safe & Lock Co., 1106 Fuller Bldg., New York City ..... Mar. 2, 1892

LUCAS, DANIEL JONES. Asst. Engr., Dept. Public Works, Bureau of Filtration of the Water Supply, 710 City Hall, Philadelphia, Pa. ..... Jun. Sept. 6, 1876; M. July 4, 1888

LUCAS, EUGENE WILLETT VAN COURT. Capt., Corps of Engrs., U. S. A., U. S. Engr. Office, Custom House, Memphis, Tenn. ..... Assoc. M. April 3, 1895; M. Sept. 5, 1900

		Date of Membership.
Lucius, Albert. Civ. and Mech. Engr., 38 Park Row, Room 137, New York City		Mar. 3, 1886
Ludlow, Jacob Lott. Cons., Municipal, San. and Hydr. Engr., Winston-Salem, N. C.		Mar. 3, 1897
Lum, David Walker. Chf. Engr., M. of Way and Structures, Southern Ry., Washington, D. C.		May 3, 1893
Lundie, John. Cons. Engr., 52 Broadway, New York City		July 4, 1888
Lusk, James Loring. Maj., Corps of Engrs., U. S. A., U. S. Engr. Office, Rock Island, Ill.		Mar. 4, 1891
Luster, William Henry, Jr. City Surv., City Hall, Elizabeth, N. J.	Assoc. M. M.	Oct. 3, 1900 April 2, 1902
Lydon, William Anthony. Pres., Chicago & Great Lakes Dredge & Dock Co., Chamber of Commerce, Chicago, Ill.	Jun. M.	Jan. 4, 1888 Dec. 5, 1894
Lynch, Michael Lehane. Chf. Engr., St. Louis S. W. Ry. System, Tyler, Tex.		May 4, 1892
Lyon, Henry Lloyd. Deputy Water Commr., Municipal Bldg., Buffalo, N. Y.		Feb. 3, 1904
Lyons, James Knox. Asst. Res. Engr., Am. Bridge Co., Ambridge, Pa.; Address, Elmhurst Inn, Sewickley, Pa	Assoc. M. M.	May 1, 1895 Oct. 5, 1898
MacAllister, Dickinson. Pres., The Met. West Side Elev. Ry. Co., 1001 Royal Insurance Bldg., Chicago, Ill.		April 1, 1896
Macdonald, Charles. 2 Wall St., New York City		Sept. 15, 1869
MacFarlane, James. Room 509, McPhee Bldg., Denver, Colo.		April 4, 1888
MacHarg, William Storrs. 220 City Hall, Chicago, Ill		Dec. 2, 1903
Mackall, Benjamin Franklin. Chf. Asst. Engr., S. A. L. R. R., Portsmouth, Va.		Mar. 6, 1901
Mackenzie, Alexander. Brig.-Gen., Chf. of Engrs., U. S. A., Washington, D. C.		Feb. 2, 1887
Mackenzie, William Brouard. Chf. Engr., Intercolonial Ry., Moncton, N. B., Canada	Jun. M.	June 7, 1882 April 3, 1901
Macksey, Henry Vincent. 44 City Hall, Boston, Mass.		May 4, 1904
N. Maclay, William Walter. Cons. Engr., Glens Falls, N. Y.		Nov. 6, 1872
Maclennan, John Donald. 404 Colorado Bldg., Washington, D. C.		Oct. 4, 1899
MacNaughton, James. Pres. of MacIntyre Iron Co., Tahawus, Essex Co., N. Y.		May 5, 1880
MacRitchie, Charles. 21 Quincy St., Chicago, Ill.	Assoc. M.	Oct. 2, 1872 April 5, 1876
McCann, Thomas Henry. Second National Bank Bldg., Hoboken, N. J. (also Care, North River Bridge Co., 45 Cedar St., New York City)		April 2, 1890
McCarty, Richard Justin. 3820 Warwick Boulevard, Kansas City, Mo.		Dec. 4, 1895
McClintock, J. Y. County Engr. of Monroe County, Rochester, N. Y.		Oct. 2, 1895
McClintock, William Edward. Chairman, Mass. Highway Comm., 20 Pemberton Sq., Boston, Mass.		Dec. 5, 1888

Date of Membership.

McCollom, Thomas Chalmers. 4606 Springfield Ave., Philadelphia, Pa. May 3, 1882

McComb, Charles Oscar. Div. Engr. of Middle Div., Dept. of the State Engr. and Surv., Syracuse, N. Y. May 2, 1900

McComb, David E. Supt. of Sewers, Washington, D. C. Feb. 7, 1877

McConnel, Wilfred Gillette. Asst. Mgr., Cuba Eastern R. R. Co., Guantanamo, Cuba. June 3, 1903

McCool, Daniel. Pres., Newaygo (Mich.) Portland Cement Co.; Pres., Grand Rapids Edison Co., Grand Rapids, Mich. Sept. 5, 1883

McCormick, George King. Roadmaster, A. K. & N. Ry., Blue Ridge, Ga. { Jun. Feb. 6, 1889 / M. May 4, 1898

McCormick, Robert Hugh. City Engr., Detroit, Mich. Sept. 7, 1898

McCulloh, Ernest. City Engr., North Yakima, Wash. May 6, 1903

McCulloh, Walter. Niagara Falls, N. Y. { Jun. July 4, 1888 / M. June 7, 1893

McCurdy, John Egbert. Apartado 2217, City of Mexico, Mexico. April 1, 1896

McDONALD, HUNTER. (*Director*). Chf. Engr. and Real Estate Agt., N., C. & St. L. Ry., Nashville, Tenn. { Jun. April 4, 1883 / M. Mar. 7, 1888

McDonald, John Alexander. Care, James E. McDonald, 4 Chapel St., Cripplegate, London, E. C., England. Feb. 5, 1890

McDonald, William Naylor. Chf. Engr., Tenn. Central R. R. Co., Nashville, Tenn. Sept. 3. 1902

McGrath, Wallace. 1109 Tennessee St., Lawrence, Kans. Sept. 5, 1883

McGrew, Anson Burlingame. U. S. Asst. Engr., Beaver, Pa. June 4, 1902

McHenry, Edwin Harrison. Fourth Vice-Pres., N. Y., N. H. & H. R. R. Co., New Haven, Conn. Feb. 5, 1896

McKay, John Edwards. Prin. Asst. Engr., Dept., Water Supply, 13 Park Row, New York City. July 5, 1893

McKeen, Benjamin. Gen. Mgr., Vandalia R. R., 806 Century Bldg., St. Louis, Mo. Nov. 6, 1895

McKenzie, Theodore Hall. Engr., State Board of Health; Mem., State Board of Civ. Engrs., 40 Stearns Bldg., Hartford, Conn. Sept. 7, 1881

McKim, Alexander Rice. Archt. and Engr., 36 East 28th St., New York City. { Assoc. M. April 4, 1894 / M. May 4, 1898

McKim, James Arthur. Vice-Pres. and Gen. Mgr., Noelke-Richards Iron Works (Res., 2150 North Meridian St.), Indianapolis, Ind. Oct. 2, 1901

McKinstry, Charles Hedges. Capt., Corps of Engrs., U. S. A., 518 Bradbury Bldg., Los Angeles, Cal. { Assoc. M. Sept. 2, 1896 / M. May 3, 1899

McLain, Louis Randolph. Pres., Florida Eng. Co., St. Augustine, Fla. Feb. 2, 1881

McLaughlin, John Joseph. County Engr., Queens Co., Jamaica, N. Y. Nov. 1, 1893

McLean, Archibald. Engr. in Chg., Brooklyn Bridge, 179 Washington St., Brooklyn, N. Y. May 6, 1903

McMath, Robert Emmet. Pres., R. E. McMath Surveying Co., 328 Lincoln Trust Bldg., St. Louis, Mo. Mar. 3, 1880

McMillan, Charles. Prof. of Civ. Eng. and Applied Math., Princeton Univ., Princeton, N. J. Jan. 29, 1868

	Date of Membership.
McMINN, THOMAS JAMES. (*Assistant Secretary*). 220 West 57th St., New York City	Mar. 5, 1890
McNEAL, JOHN, Jr. Asst. Engr., Lehigh Coal & Nav. Co., 507 Drake Bldg., Easton, Pa	Dec. 2, 1903
McNICOL, JOHN ALEXANDER. 11 Mercaderes, Havana, Cuba	Sept. 1, 1897
McNULTY, GEORGE WASHINGTON. 258 Broadway, New York City	May 5, 1880
McVEAN, JOHN JAY. Cons. Engr., 16 State St., Grand Rapids, Mich.	Sept. 3, 1884
MAIS, HENRY COATHUPE. Cons. Engr., Prell's Bldgs., 60 Queen St., Melbourne, Victoria, Australia	June 6, 1883
MAITLAND, ALEXANDER, Jr. 1109 McGee St., Kansas City, Mo	Nov. 6, 1901
MALTBY, FRANK BIERCE. Div. Engr. in Chg. of Dredging Operations, Isthmian Canal Comm., Washington, D. C	April 3, 1895
MAN, ALBON PLATT. Gen. Mgr., Arminius Mines, Mineral, Va	Sept. 5, 1883
MANLEY, HENRY. Asst. Engr., Eng. Dept., Room 52, City Hall, Boston, Mass	June 2, 1880
MANNING, WILLIAM THURSTON. Cons. and Contr. Engr., 824 Equitable Bldg., Baltimore, Md	Feb. 5, 1896
MANSFIELD, MARTIN WILLIAM. Supt., Penn. Lines, Indianapolis, Ind.	July 5, 1882
MANSON, MARSDEN. Cons. Engr., University Club, San Francisco, Cal.	Sept. 6, 1882
MARBURG, EDGAR. Prof. of Civ. Eng., Univ. of Pennsylvania, Philadelphia, Pa	Oct. 6, 1897
MARDEN, HENRY HERMAN, Jr. With United Eng. & Contr. Co., 13 Park Row, New York City	May 1, 1901
MARPLE, WILLIAM McKELVEY. Chf. Engr., The Scranton Gas & Water Co., Dunmore Gas & Water Co., Archbald Water Co., Olyphant Water Co., Scranton, Pa	June 4, 1890
MARR, GEORGE ANSON. Supt. and Asst. Engr., U. S. Portage Lake Ship Canals, Mich., Houghton, Mich	Oct. 3, 1883
MARSHALL, HORACE MILLER. U. S. Asst. Engr., Monroe, La	Dec. 3, 1890
MARSHALL, ROBERT BRADFORD. Topographer, U. S. Geological Survey, Sacramento, Cal	May 4, 1904
MARSTON, ANSON. Dean of Div. of Eng., Iowa State Coll.; Cons. Engr., Ames, Iowa	Assoc. M. Oct. 4, 1893 M. Oct. 7, 1903
MARSTRAND, OTTO JULIUS. Hopetoun House, 5 Lloyds Ave., London, E. C., England	May 7, 1890
MARTIN, KINGSLEY LEVERICH. Engr., in Chg. Williamsburgh Bridge, Dept. of Bridges, New York City	Jun. Nov. 5, 1895 Assoc. M. May 3, 1899 M. Dec. 1, 1903
MARTIN, WILLIAM. U. S. Asst. Engr., 14 Sprague Ave., Bellevue, Pa.	Jan. 7, 1903
MARTIN, WISNER. Park Row Bldg., New York City	Jun. May 3, 1892 Assoc. M. July 3, 1895 M. May 1, 1901
MARVIN, FRANK OLIN. Dean of School of Eng., Univ. of Kansas; Engr. to State Board of Health, Lawrence, Kans	May 5, 1897
MARX, CHARLES DAVID. (*Director*). Prof. of Civ. Eng., Leland Stanford, Jr., Univ.; Cons. Engr., Stanford University, Santa Clara Co., Cal	Oct. 7, 1896

	Date of Membership.
MASON, ARTHUR JOHN. Contr. Engr. (Hoover & Mason), Chicago, Ill..	Sept. 5, 1888
MASON, SAMPSON DOUGLAS. Junior Engr., U. S. Fortification Work, Fort Casey, Island Co., Wash.	Oct. 6, 1886
MATCHAM, CHARLES ARTHUR. Mgr., Lehigh Portland Cement Co., Allentown, Pa.	June 5, 1901
MATHER, THOMAS HOGGAN. Chf. Engr., Syracuse R. R. Constr. Co., 531 Onondaga County Savings Bank Bldg., Syracuse, N. Y.	Oct. 1, 1902
MATHESON, DONALD ALEXANDER. Engr.-in-Chf., Caledonian Ry., Buchanan St. Station, Glasgow, Scotland.	Oct. 7, 1903
MATHEWSON, ISAAC. Sugar Mfr., Santa Fe, Distrito de Alarcon, Guerrero, Mexico.	Assoc. M. Mar. 7, 1894 M. Mar. 1, 1904
MATTHES, GERARD HENDRIK. Dist. Engr., Reclamation Service and Special Disbursing Agt., U. S. Geological Survey, Lawton, Okla.	Assoc. M. June 6, 1900 M. Jan. 31, 1905
MAURICE, CHARLES STEWART. Athens, Pa.	May 15, 1872
MAURY, DABNEY HERNDON. Cons. Engr., 129 North Jefferson Ave., Peoria, Ill.	May 3, 1899
MAXIM, *Sir* HIRAM STEVENS. Thurlow Park, Norwood Road, West Norwood, London, England.	Oct. 7, 1885
MAXSON, FRANK OSCAR. Civ. Engr., U. S. N., Navy Yard, League Island, Pa.	May 1, 1889
MAXWELL, JAMES RIDDLE. Cons. Engr., Newark, Del.	April 17, 1872
MAY, DECOURCY. Pres., New York Shipbuilding Co., Camden, N. J. (Res., 12th and Spruce Sts., Philadelphia, Pa.).	Mar. 6, 1895
MAY, WILLIAM ANDREW. Gen. Mgr., Hillside Coal & Iron Co., Box 553, Scranton, Pa.	July 6, 1881
MAYER, JOSEPH. Cons. Engr., 1 Broadway, New York City	Oct. 3, 1894
MAYNE, CHARLES. Municipal Engr., Kiangse Rd., Shanghai, China...	Jan. 1, 1896
MEAD, CHARLES ADRIANCE. 165 Wildwood Ave., Upper Montclair, N. J.	Assoc. M. April 5, 1899 M. Jan. 5, 1904
MEAD, DANIEL WEBSTER. Cons. Engr.; Prof., Hydr. and San. Eng., Univ. of Wisconsin, 738 First National Bank Bldg., Chicago, Ill.	Assoc. M. July 1, 1891 M. Dec. 6, 1893
MEAD, ELWOOD. (*Director*). Chf. of Irrig. and Drainage Investigations, Dept. of Agriculture, Washington, D. C.	June 7, 1893
MEIGS, MONTGOMERY. U. S. Civ. Engr., Office, U. S. Des Moines Rapids Canal, Keokuk, Iowa.	Mar. 5, 1879
MELCHER, FRANK OTIS. Gen. Supt., Choctaw Dist., C., R. I. & P. Ry., Little Rock, Ark.	Mar. 3, 1897
MELLISS, DAVID ERNEST. Cons. Civ. and Min. Engr., 208 California St., San Francisco, Cal.	Oct. 2, 1895
MELVIN, DAVID NEILSON. Supt. and Engr., Am. Linoleum Mfg. Co., Linoleumville, N. Y.	July 3, 1878
MENOCAL, ANICETO G. Civ. Engr., U. S. N., 251 West 81st St., New York City.	Feb. 3, 1875

		Date of Membership.
MERCER, CHARLES HATTON. Asst. Engr. of Constr., Bridge and Constr. Dept., The Pennsylvania Steel Co., Steelton, Pa.	Assoc. M.	Nov. 3, 1897
	M.	May 1, 1901
MERRILL, GEORGE NATHAN. Civ. and Cons. Engr. (Geo. N. Merrill & Co.), 292 Main St., Room 7, Springfield, Mass.		May 1, 1889
MERRILL, WILLIAM FESSENDEN. First Vice-Pres., N.Y., N. H. & H. R. R., New Haven, Conn.		April 1, 1874
MERRIMAN, MANSFIELD. Prof. of Civ. Eng., Lehigh Univ., South Bethlehem, Pa.	Jun.	May 12, 1875
	M.	Sept. 3, 1884
MERRITT, DAVID SPENCER. 10 N. Broadway, Tarrytown, N. Y.		Jan. 4, 1905
MERRYMAN, WILLIAM CURTIS. Res. Engr., 3d Div., Rapid Transit Subway Constr. Co., 1913 Amsterdam Ave. (Res., 562 West 149th St.), New York City.		Oct. 4, 1899
MERSEREAU, CHARLES VERNON. Asst. Engr., Water-Works Extension, 77 E. May St., St. Louis, Mo.		Dec. 3, 1884
METCALF, LEONARD. Hydr. and San Engr., 14 Beacon St., Boston, Mass.	Assoc. M.	Jan. 5, 1898
	M.	Sept. 2, 1903
R. METCALF, WILLIAM. (*Past-President*). 1 Fulton St., Pittsburg, Pa.		July 2, 1873
MEYER, RUDOLF. With Compañia Fundidora de Fierro y Acero, Apartado 55, Monterey, Mexico.		Oct. 5, 1898
MEYER, THOMAS C. 13 East 48th St., New York City.		Dec. 7, 1852
MICHELL, THEOPHILUS. Superintending Engr., State Ry. (India), Windsor Lodge, Taunton, England.		Jan. 2, 1901
MILLER, CHARLES HENRY. Engr. with McClintic-Marshall Const. Co. at Rankin, Pa.; Address, 727 East End Ave., Pittsburg, Pa.		May 2, 1899
MILLER, EDWARD FURBER. Assoc. Prof. of Steam Eng., at Mass. Inst. Tech., Boston (Res., 538 Ward St., Newton Center), Mass.		June 3, 1903
MILLER, FRANK. Chf. Engr., Snare & Triest Co., 39 Cortlandt St., New York City.		Oct. 5, 1904
MILLER, HARVEY COOPER. (H. C. Miller & Co., Concrete-steel Engrs.), 1 Madison Ave., New York City.		June 5, 1901
MILLER, HIRAM ALLEN. Chf. Engr., Charles River Basin Comm., 367 Boylston St., Boston (Res., 15 Duncklee St., Newton Highlands), Mass.		May 6, 1896
MILLER, RUDOLPH PHILIP. 141 East 40th St., New York City.	Jun.	Jan. 2, 1890
	Assoc. M.	April 7, 1897
	M.	Jan. 5, 1904
MILLER, SPENCER. Chf. Engr., Cableway Dept., Lidgerwood Mfg. Co., 96 Liberty St., New York City.	Assoc.	July 3, 1889
	M.	Nov. 7, 1894
MILLIS, JOHN. Maj. of Engrs., U.S.A., U. S. Engr. Office, Seattle, Wash.		Mar. 7, 1900
MILLS, ARTHUR LORENZO. Pres., United Grain Co., 2132 Glenwood Ave., Toledo, Ohio.		May 2, 1888
MILLS, CHARLES MALON. Prin. Asst. Engr., Subway and Elev. Ry. Constr., Phil. Rap. Trans. Co., 9th and Dauphin Sts., Philadelphia, Pa.	Jun.	June 2, 1886
	M.	Sept. 3, 1890
MINER, CHARLES AUGUSTINE. Petersburg, Va.	Assoc. M.	April 7, 1897
	M.	Dec. 4, 1901

		Date of Membership.
MITCHELL, CHARLES HAMILTON. Asst. Engr., Ontario Power Co., Niagara Falls, Ont., Canada	Assoc. M.	June 4, 1902
	M.	Jan. 5, 1904
MITCHELL, SAMUEL PHILLIPS. Chf. Engr., Am. Bridge Co. of N. Y., 1525 Frick Bldg., Pittsburg, Pa		April 1, 1903
MIXER, CHARLES ADAM. Engr., Rumford Falls Power Co., Rumford Falls, Me		Nov. 1, 1893
MOBERLY, FRANK. Care, Trans-Continental Ry., Ottawa, Ont., Canada.		Oct. 7, 1903
MODJESKI, RALPH. (*Director*). Cons. Engr., 1643 Monadnock Bldg., Chicago, Ill	Jun.	Dec. 1, 1886
	Assoc. M.	July 1, 1891
	M.	Mar. 3, 1897
MOGENSEN, OLAF EINAR. Care, 502 Missouri Pacific Bldg., St. Louis, Mo	Assoc. M.	April 7, 1897
	M.	Sept. 2, 1903
MOHUN, EDWARD. Union Club, Victoria, B. C., Canada		April 6, 1892
MOIR, ERNEST WILLIAM. 1 Cumberland Terrace, Regents' Park, London, N. W., England		Sept. 7, 1904
MOLERA, EUSEBIUS JOSEPH. 2025 Sacramento St., San Francisco, Cal.		Oct. 5, 1904
MOLITOR, DAVID ALBERT. Civ. and Cons. Engr., 25 N. Park Ave., Fond du Lac, Wis		Oct. 6, 1897
MOLITOR, FREDERIC ALBERT. Gen. Mgr. and Chf. Engr., Midland Val. R. R.; Chf. Engr., Cherokee Constr. Co., Fort Smith, Ark		Nov. 4, 1896
MONCRIEFF, ALEXANDER BAIN. Engr. in Chf., South Australia, Adelaide, South Australia		July 4, 1894
MONCRIEFF, JOHN MITCHELL. 1 St. Nicholas Bldgs., Newcastle-upon-Tyne, England		Nov. 3, 1897
MONTFORT, RICHARD. Cons. Engr., L. & N. R. R., Louisville, Ky.		June 6, 1888
MONTGOMERY, JOHN ALEXANDER. Cons. Engr., Room 925, First National Bank Bldg., Birmingham, Ala		Jan. 1, 1896
MOODY, BURDETT. Mgr., Shoshone Mountain Min. Co., Meeteetse, Big Horn Co., Wyo	Assoc. M.	Feb. 3, 1897
	M.	June 5, 1901
MOORE, CHARLES EDWARD. Cons. Engr., Santa Clara, Cal		Jan. 7, 1880
MOORE, CHARLES HARRY. First Asst. Engr., Erie R. R. Co., Chic. & Erie R. R. Co., N. Y., S. & W. R. R. R. Co., 26 Cortlandt St., New York City	Assoc. M.	April 5, 1893
	M.	Sept. 4, 1901
MOORE, JAMES EDWIN ALEXANDER. Estimating Engr., The Wellman-Seaver-Morgan Co., Cleveland, Ohio		June 5, 1901
MOORE, ROBERT. (*Past-President*). Cons. Engr., Laclede Bldg., St. Louis, Mo.		April 5, 1876
MOORE, WILLIAM HARLEY. Engr. of Bridges, N. Y., N. H. & H. R. R., New Haven, Conn		June 4, 1895
MORAN, DANIEL EDWARD. The Foundation Co., 35 Nassau St., New York City	Assoc. M.	June 3, 1891
	M.	Jan. 1, 1896
MORDECAI, AUGUSTUS. Garfield Bldg., Cleveland, Ohio		Feb. 1, 1893
MORLEY, FRED. Lapeer, Mich	Assoc. M.	May 6, 1891
	M.	Mar. 4, 1896
MORRILL, GEORGE SULLIVAN. Div. Engr., N. Y., N. H. & H. R. R. Co., Boston, Mass		Mar. 2, 1887

Date of Membership

MORRIS, CHARLES JOHN AUGUSTUS. Cons. Engr. and Contr., P. O. Box 254, St. Paul, Minn. — Oct. 3, 1883

MORRIS, HENRY GURNEY. Engr. and Machinist, 333 Walnut St., Philadelphia, Pa. — Dec. 4, 1867

MORRIS, MARSHALL. Cons. Engr.; Pres., Breckinridge Asphalt Co., Room 303, Norton Bldg., Louisville, Ky. — Mar. 5, 1873

MORRISON, HENRY PRENTICE. Broadway and Forest Ave., West New Brighton, N. Y. — April 6, 1898

MORROW, JAY JOHNSON. Capt., Corps of Engrs., U. S. A., District Bldg., Washington, D. C. — Assoc. M. June 5, 1901; M. Mar. 1, 1904

MORSE, BENJAMIN FRANKLIN. 729 Giddings Ave., Cleveland, Ohio. — July 12, 1877

MORSE, CHARLES ADELBERT. Asst. Chf. Engr., A., T. & S. F. Ry., Topeka, Kans. — April 6, 1898

MORSE, CHARLES JAMES. 1825 Asbury Ave., Evanston, Ill. — Feb. 6, 1884

MORSE, CHARLES MILLER. Engr. Commr., Dept. of Public Works, Buffalo, N. Y. — Jan. 2, 1895

MORSE, EDWIN KIRTLAND. Farmers Bank Bldg., Pittsburg, Pa. — June 6, 1900

MORTON, CHARLES. Cons. Civ. Engr., 53 State St., Boston. Mass. — Oct. 2, 1895

MOSES, JOHN CRANCH. Engr. of Constr., The Boston Bridge Works, Inc., Cambridge, Mass. — Jun. July 2, 1890; Assoc. M. May 4, 1898; M. May 3, 1904

MOSMAN, ALONZO TYLER. Asst., U. S. Coast and Geodetic Survey, 189 Montague St., Room 205, Brooklyn, N. Y. — July 1, 1885

MOSSCROP, ALFRED MITTON. Mgr., Constructional Dept., Dorman, Long & Co., Ltd., Middlesbrough, England — Jun. May 4, 1887; Assoc. M. May 3, 1893; M. Oct. 4, 1899

MOULTON, MACE. Cons. Civ. Engr., 150 Nassau St., New York City. — June 4, 1884

MUENSCHER, EMORY WASHBURN. Chf. Engr., Manistee & Grand Rapids R. R., Manistee, Mich. — July 5, 1893

MÜNSTER, ANDREW WENDELBO. Acting Chf. Engr., Chic. Gt. West. Ry., St. Paul, Minn. — May 1, 1889

MURAKAMI, KYOICHI. 14 Wakamatsu-Cho, Osaka, Japan. — Sept. 4, 1901

MYERS, CHARLES HAYWARD. Aldrich Court, 45 Broadway, New York City. — Aug. 5, 1868

MYERS, EDMUND TROWBRIDGE DANA. Pres., Richmond, Fredericksburg & Potomac R. R. Co., Washington South. Ry. Co., Richmond, Va. — May 2, 1888

MYERS, EDMUND TROWBRIDGE DANA, Jr. 1103 Grove Ave., Richmond, Va. — Jun. May 2, 1888; M. June 7, 1899

NAUMAN, GEORGE. Asst. Engr., Constr., P. R. R., Union Station, Harrisburg, Pa. — May 4, 1904

NEALE, JOHN COLWELL. Structural Engr., Carnegie Steel Co., Pittsburg, Pa. — Jan. 7, 1903

NEHER, CLARENCE RUFUS. Engr. and Gen. Mgr., Continental Eng. & Contr. Co., 305 D. S. Morgan Bldg., Buffalo, N. Y. — June 4, 1902

NEILSON, GEORGE HARRISON. Gen. Mgr., Braeburn Steel Co., Braeburn, Pa. — Oct. 5, 1904

Date of Membership.

NELLES, GEORGE THOMAS. U. S. Asst. Engr., 523 Caxton Bldg., Cleveland, Ohio ..... Oct. 3, 1888

NETHERCUT, EDGAR S. Chf. Engr., Paige Iron Works and Buda Foundry & Mfg. Co., 637 Railway Exchange, Chicago, Ill..... April 6, 1904

NEWBROUGH, WILLIAM. Civ. and Min. Engr., Evanston, Wyo..... April 6, 1904

NEWELL, FREDERICK HAYNES. Chf. Engr., U. S. Reclamation Service, 1330 F St., N. W., Washington, D. C ..... Dec. 5, 1900

NEWMAN, EMIL. 1048 West 8th St., Los Angeles, Cal..... Jan. 4, 1905

NEWMAN, ROBERT MORRIS. Jackson, Mich. ..... May 6, 1874

NICHOL, JOHN. 21 Quincy St., Chicago, Ill..... Assoc. Oct. 2, 1872; M. April 5, 1876

NICHOLS, EDWIN JAY. Engr., M. of W., N. Y., Tex. & Mex. Ry. and Gulf, West. Tex. & Pac. Ry., Victoria, Tex..... ..... Sept. 2, 1896

NICHOLS, LEWIS ABEL. Cons. Engr., 225 Dearborn St., Room 508, Chicago, Ill..... Oct. 5, 1892

NICHOLS, OTHNIEL FOSTER. Chf. Engr., Dept. of Bridges, New York City (Res., 42 Gates Ave., Brooklyn, N. Y)..... June 7, 1876

NICHOLS, WILLARD ATHERTON. Redlands, Cal..... May 7, 1873

NICHOLSON, GEORGE BENSON. Chf. Engr., C., N. O. & S. P. Ry. Co. and A. G. S. R. R. Co., 530 Garrard St., Covington, Ky..... May 1, 1878

NICOLLS, WILLIAM JASPER. Box 120, St. Davids, Pa..... June 5, 1878

NICOLSON, GEORGE LLEWELLYN. Gen. Mgr., C. & O. Canal, Washington, D. C..... Dec. 5, 1894

NOBLE, ALFRED. (*Past-President*). 1 West 34th St., New York City..... Jun. Sept. 2, 1874; M. April 3, 1878

NOBLE, THERON AUGUSTUS. Engr., U. S. Geological Survey, Peyton Blk., Spokane, Wash .... June 2, 1897

NORRIS, ROBERT VAN ARSDALE. Cons. Engr., Bennett Bldg., Wilkesbarre, Pa..... ..... Jun. Dec. 7, 1887; M. Mar. 5, 1902

N. NORTH, EDWARD P. 220 West 57th St., New York City ..... Dec. 4, 1867

NORTHRUP, HERBERT FRANKLIN. Res. Engr., C., C., C. & St. L. Ry., Guilford, Ind..... ..... Jan. 6. 1892

NORTON, ALBERT GRAY. Insp., Eng. Dept., B. & O. R. R., Washington, D. C.. .... Dec. 4, 1901

NORTON, JOHN TALCOTT. Secy.-Treas. and Asst. Engr., Public Belt R. R. Comm., Room 30, City Hall, New Orleans, La. ..... Nov. 3, 1897

NOSTRAND, PETER ELBERT. Official Surv., The Lawyers' Title Insurance Co. of New York; Cons. Engr., 37 Liberty St., New York City..... ..... Assoc. M. Sept. 7, 1892; M. Mar. 6, 1895

NOYES, ELLIS BRADFORD. Civ. Engr.'s Office, U. S. Navy Yard, Norfolk, Va..... Jun. July 7, 1880; M. Oct. 2, 1889

NUEBLING, EMIL LOUIS. Supt. and Engr., Dept. of Water, Reading, Pa..... ..... Dec. 7, 1904

NUNN, PAUL N. Chf. Engr., Telluride Power Co., Provo, Utah..... Sept. 7, 1904

OAKLEY, FRANK THOMPSON. 1012 The Spitzer, Toledo, Ohio..... Assoc. M. Feb. 6, 1895; M. June 6, 1900

Date of Membership.

OCKERSON, JOHN AUGUSTUS. Cons. Engr.; Mem., Mississippi River Comm., St. Louis, Mo.... July 7, 1880

ODELL, FREDERICK SYLVESTER. Port Chester, N. Y.... Mar. 5, 1884

O'DONNELL, JOHN PATRICK. Palace Chambers, Westminster, S. W., London, England.... July 5, 1893

O'HANLY, JOHN LAWRENCE POWER. Cons. Engr., Ottawa, Ont., Canada. Sept. 5, 1883

OLCOTT, EBEN ERSKINE. Min. Engr., 36 Wall St., New York City.... July 5, 1893

OLMSTED, ASHBEL EDWARD. Div. Engr., Rapid Transit Subway Constr. Co., 500 West 143d St., New York City.... May 6, 1903

OLMSTED, FRANK HENRY. Gen. Contr., Olmsted & Poulson, 616 Grant Bldg., Los Angeles, Cal.... Feb. 7, 1900

OLNEY, ALFRED CLARENCE. Asst. Engr., Cent. of Ga. Ry., Savannah, Ga.... Jun. April 30, 1895; M. Nov. 2, 1898

OLNEY, LAFAYETTE. Civ. Cons. Engr., 99 Nassau St., New York City. Oct. 7, 1868

OPDYKE, STACY BROWN, Jr. Vice-Pres., Levering & Garrigues Co., 552 West 23d St., New York City.... Feb. 2, 1876

ORANGE, JAMES. (Leigh & Orange), Hong Kong, China.... Dec. 3, 1890

O'ROURKE, JOHN FRANCIS. Pres., O'Rourke Eng. Constr. Co., 1 West 34th St., New York City.... April 2, 1884

OSBORN, FRANK CHITTENDEN. Pres., The Osborn Eng. Co., Osborn Bldg., Cleveland, Ohio.... Oct. 3, 1888

OSGOOD, JOSEPH OTIS. (*Director*). Chf. Engr., C. R. R. Co. of N. J., Jersey City (Res., Plainfield), N. J.... Jun. May 3, 1876; M. Mar. 5, 1879

O'SHAUGHNESSY, MICHAEL MAURICE. Civ. and Cons. Engr., 193 Crocker Bldg., San Francisco, Cal.... June 4, 1902

OSTROM, JOHN NELSON. Bridge Engr., 1518 Farmers Bank Bldg., Pittsburg, Pa.... Nov. 5, 1890

OSTRUP, JOHN CHRISTIAN. Cons. Engr., 41 Wall St., New York City.... Assoc. M. Mar. 4, 1896; M. Mar. 1, 1899

OTAGAWA, MASAYUKI. 57 Haramachi Itchome, Ushigomeku, Tokyo, Japan.... Jan. 2, 1895

OTIS, GEORGE ELLISON. Mansfield, Ark.... July 3. 1895

OWEN, JAMES. Cons. Engr., 196 Market St., Newark, N. J.... Sept. 15, 1869

OWENS, HENRY KINDER. Cons. Civ. Engr., Seattle, Wash.... Mar. 6, 1889

OXHOLM, THEODOR SMIDT. Prin. Asst. Engr., Office of Pres. of the Borough of Richmond, St. Austins Pl., West New Brighton, N. Y. Nov. 3, 1897

PACKARD, RALPH GOODING. 130 Pearl St., New York City.... Feb. 17, 1869

PAGET, EDMUND WINTER. (Paget & Clark), Room 38, Washington Bldg., Portland, Ore.... June 5, 1901

PAINE, ARTHUR BICKLEY. Room 220, Bourse Bldg., Philadelphia, Pa. Sept. 6, 1882

PAINE, CHARLES. (*Past-President*). Cons. Engr., Tenafly, N. J.. Dec. 4, 1867

PALMER, FREDERICK. Bengal Club, 1 Park St., Calcutta, India.... Oct. 4, 1899

PALMER, JOHN ELDEN. (Gow & Palmer, Civ. Engrs. and Contrs.), 50 Congress St., Boston, Mass.... June 1, 1904

PARDEE, JAMES THOMAS. 242 Clifton Boulevard, Cleveland, Ohio.... Assoc. M. June 5, 1895; M. June 5, 1901

Date of Membership.

PARET, MILNOR PECK. Chf. Engr., The Kans. City, Mex. & Orient Ry. Co., 705 Bryant Bldg., Kansas City, Mo. ..... Sept. 2, 1885

PARKER, ANDREW MCCLEAN. Chf. Engr., Ryan-Parker Constr. Co., 13 Park Row, New York City ..... Mar. 6, 1889

PARKER, CHARLES JEREMIAH. Prin. Asst. Engr., N. Y. C. & H. R. R. R., New York City ..... Feb. 7, 1900

PARKER, HAROLD. Mem., Mass. Highway Comm.; Mem. Wachusett Mt. State Reservation Comm.; (Parker & Bateman), Clinton (Res., So. Lancaster), Mass ..... June 7, 1899

PARKER, MAURICE STILES. Engr. and Contr., Baxter Springs, Kans... Feb. 5, 1890

PARKER, WILLIAM. Div. Engr., Boston & Albany R. R., N. Y. C. & H. R. R. R. Co., Lessee, Room 372, South Station, Boston, Mass. Mar. 7, 1900

PARKHURST, HENRY WILLIAMS. Cons. Bridge Engr., Ill. Cent. System, 1 Park Row, Chicago, Ill. ..... Sept. 5, 1877

PARMLEY, WALTER CAMP. Cons. Engr., Sewerage, Hydraulics, Concrete-Steel Constr., 114 Liberty St., New York City ..... Assoc. M. April 1, 1896; M. June 1, 1898

PARSONS, HARRY DE BERKELEY. Cons. Engr., 22 William St., New York City, and Prof. of Steam Eng., Rensselaer Polytechnic Inst., Troy, N. Y. ..... Feb. 3, 1897

PARSONS, HENRY CUYLER. Tweddle Bldg., Albany, N. Y. ..... Oct. 6, 1886

PARSONS, WILLIAM BARCLAY. Cons. Engr., 320 Broadway, New York City ..... Jun. June 7, 1882; M. Nov. 2, 1887

PASCHKE, THEODORE. 1 West 100th St., New York City. ..... Mar. 7, 1894

PATRICK, MASON MATHEWS. Maj., Corps of Engrs., U. S. A., West Point, N. Y. ..... Oct. 7, 1903

PATTEN, HENRY BENJAMIN. 208 West 22d St., Cheyenne, Wyo ..... Jan. 4, 1888

PATTERSON, JOHN CURTIS. Pres., The Philadelphia Clay Mfg. Co., 706 Drexel Bldg., Philadelphia, Pa ..... Oct. 2, 1889

PEARL, JAMES WARREN. Engr. and Contr., Benton Harbor, Mich.... Jan. 2, 1889

PEARSON, FRED STARK. Cons. Engr., 29 Broadway, New York City. . Nov. 3, 1897

PEARSONS, GALEN W. Civ. and Mech. Engr., 1611 Baltimore Ave., Kansas City, Mo. ..... Jan. 6, 1875

PEARY, ROBERT EDWIN. Civ. Engr., U. S. N., 2014 Twelfth St., N. W., Washington, D. C. ..... Mar. 3, 1886

PEGRAM, GEORGE HERNDON. Chf. Engr., Man. Div., Interborough Rap. Trans. Co., 195 Broadway, New York City. Jun. April 7, 1880; M. Jan. 3, 1883

PENCE, WILLIAM DAVID. Prof. of Civ. Eng., Purdue Univ., Lafayette, Ind. ..... Oct. 4, 1899

PERKINS, CHARLES PENROSE. 2005 DeLancey St., Philadelphia, Pa. ..... Jun. Feb. 3, 1875; M. April 5, 1882

PERKINS, EDMUND TAYLOR. Engr., Reclamation Service, U. S. Geological Survey, Washington, D. C. ..... Dec. 3, 1902

PERRILLIAT, ARSÈNE. Mem., Board of State Engrs., Cotton Exchange Bldg., New Orleans, La. ..... Assoc. M. June 7, 1893; M. April 5, 1899

PETERSON, PETER ALEXANDER. Cons. Engr., Canadian Pacific Ry., Montreal, Que., Canada ..... Jan. 5, 1876

Date of Membership.

PETTIGREW, THOMAS. Chf. Engr., National Ry. Constr. Co., 316 Providence Bldg., Duluth, Minn ..... Oct. 4, 1893

PEW, ARTHUR. Cons. Engr., 619 Temple Court Bldg., Atlanta, Ga.... Dec. 2, 1885

PHILLIPS, ARTHUR LOUIS. Asst. Chf. Engr., New Orleans Terminal Co., 1561 St. Louis St., New Orleans, La ..... Nov. 4, 1903

PHILLIPS, ASA EMORY. D. C. Asst. Engr.; Engr. in Chg., Plans and Constr., Sewage Disposal System, 2d and N Sts., S. E., Washington, D. C..... Jun. Nov. 5, 1891; Assoc. M. Dec. 7, 1898; M. Sept. 4, 1901

PHILLIPS, HIRAM. Cons. Hydr. and San. Engr.; Pres., Board Public Impvts., St. Louis, Mo..... Assoc. M. Jan. 3, 1894; M. Nov. 3, 1897

PHILLIPS, JOSEPH LESLIE. Director of the Compañia de Inguarán, Capuchinas 7, City of Mexico, Mexico..... Nov. 3, 1897

PHILLIPS, RICHARD HARVEY. Cons. Engr., 503 Security Bldg., St. Louis, Mo..... Dec. 7, 1904

PICKETT, WILLIAM DOUGLAS. 247 North Broadway, Lexington, Ky.... July 6, 1853

PIERCE, HENRY. Div. Supt., C. & O. Ry., Ronceverte, W. Va..... Dec. 5, 1894

PIERCE, WILLIAM THOMAS. 12 Russell Ave., Watertown, Mass..... May 6, 1896

PIERSON, GEORGE SPENCER. (*Director*). Civ., Hydr. and San. Engr., Kalamazoo, Mich..... June 5, 1889

PIHL, OLAF RIDLEY. House Bldg., Pittsburg, Pa..... Oct. 2, 1889

PLIMPTON, ARTHUR LESLIE. Civ. Engr. in Chg. of Dept. of Civ. Eng., Surface Lines, Bost. Elev. Ry. Co., 101 Milk St., Boston, Mass. May 6, 1896

PLYMPTON, GEORGE WASHINGTON. Prof. of Civ. Eng., Brooklyn Polytechnic, Director, Cooper Union (Res., 127 Herkimer St.), Brooklyn, N. Y..... Jan. 29, 1868

POETSCH, CHARLES JULIUS. City Engr. and Pres., Board of Public Works, Milwaukee, Wis..... Jun. May 4, 1881; M. May 2, 1883

POLAND, WILLIAM BABCOCK. Chf. Engr. and Gen. Mgr., Alaska Central Ry. and the Tanana Ry. Constr. Co., Seward, Alaska..... Jun. Oct. 31, 1893; Assoc. M. May 3, 1899; M. Sept. 2, 1903

POLHEMUS, JAMES SUYDAM. U. S. Asst. Engr., Portland, Ore..... Oct. 3, 1894

POLLEDO, YSIDORO. Mgr., Banco Español de la Isla de Cuba, Havana, Cuba..... Jun. Jan. 2, 1889; M. Nov. 4, 1903

POPE, WILLARD. Vice-Pres. and Engr., The Canadian Bridge Co., Ltd., Walkerville, Ont., Canada..... Oct. 5, 1904

PORTER, ALBERT HEZEKIAH. Cons. Engr., Thetford Center, Vt..... Mar. 6, 1889

PORTER, DWIGHT. Prof. of Hydr. Eng., Mass. Inst. Tech., Boston, Mass..... Oct. 4, 1893

PORTER, HENRY HOBART. 52 William St., New York City..... June 3, 1903

PORTER, HENRY TEGMEYER. Chf. Engr., Bessemer & L. E. R. R. Co. and West. Allegheny R. R. Co., Greenville, Pa..... April 1, 1903

POST, GEORGE BROWNE. 33 East 17th St., New York City..... Sept. 2, 1896

POST, HENRY WILLIS. Cons. Structural Engr., 281 Fourth Ave., New York City..... Oct. 7, 1903

POST, WALTER A. Gen. Mgr., Newport News Shipbuilding & Dry Dock Co., Newport News, Va..... Mar. 1, 1893

POTTER, CHARLES LEWIS. Maj., Corps of Engrs., U. S. A., Duluth, Minn ..... April 1, 1903

Date of Membership.

POTTER, HENRY WITBECK. Westinghouse Elec. & Mfg. Co., 11 Pine St., New York City..... Dec. 5, 1888

POTTER, WILLIAM BANCROFT. Chf. Engr., Ry. Dept., Gen. Elec. Co., Schenectady, N. Y..... Mar. 2, 1904

POWELL, AMBROSE VINCENT. Cons. Civ. Engr., Chamber of Commerce Bldg., Chicago, Ill..... Feb. 6, 1901

POWELL, ARCHIBALD OLIN. Prin. Asst. Engr., U. S. Engr. Office, P. O. Box 654, St. Paul, Minn..... Mar. 2, 1898

POWELL, CHARLES FRANCIS. Lt.-Col., Corps of Engrs., U. S. A., P. O. Bldg., New London, Conn..... Oct. 3, 1888

POWER, GEORGE COFFIN. Ventura, Ventura Co., Cal..... Feb. 1, 1893

POWERS, JOSEPH ALLEN. Engr. and Contr. (Powers & Mansfield Co.), 280 River St., Troy, N. Y..... Jun. April 2, 1884; M. Sept. 3, 1890

POYNOR, DAVID ASHLEY. Athens, Tex..... June 1, 1892

PRATT, MASON DELANO. Cons. Engr., 18 North Third St., Harrisburg, Pa..... Jun. Sept. 5, 1888; Assoc. M. Feb. 3, 1897; M. April 3, 1901

PRATT, WILLIAM ABBOTT. Chf. Engr., N. Y., Westchester & Boston Ry., 30 Broad St., New York City (Res., 3 Davis Ave., West New Brighton, N. Y.)..... July 5, 1882

PREVOST, SUTHERLAND MALLET. Third Vice-Pres., P. R. R., Philadelphia, Pa..... Jan. 6, 1875

PRICE, WILLIAM GUNN. Mgr., Elec. Car Truck Dept., Standard Steel Car Co., Room 1118, Frick Bldg., Pittsburg, Pa..... April 3, 1895

PRICHARD, HENRY SEWALL. Am. Bridge Co., Frick Bldg, Pittsburg, Pa..... Jan. 2, 1895

PRINCE, EDWARD. Cons. Engr., Stern Bldg., Quincy, Ill..... Jun. Feb. 6, 1878; M. Nov. 1, 1882

PRINCE, GEORGE THOMAS. Chf. Engr., The Denver Union Water Co., Denver, Colo..... April 4, 1894

PRINDLE, FRANKLIN COGSWELL. Civ. Engr., U. S. N., Rear-Admiral (*Retired*), The Woodley, Washington, D. C..... Mar. 4, 1874

PRIOR, CHARLES HENRY. 68 Willon St., Minneapolis, Minn..... Mar. 1, 1882

PROBASCO, SAMUEL R. 179 Washington St., Brooklyn, N. Y..... Nov. 18, 1868

PROUT, HENRY GOSLEE. First Vice-Pres. and Gen. Mgr., Union Switch & Signal Co., 132 Liberty St., New York City..... Assoc. Nov. 6, 1872; M. Sept. 3, 1879

PURDON, CHARLES DE LA CHEROIS. Engr., M. of W., Frisco System, St. Louis, Mo..... Mar. 3, 1886

PURDY, CORYDON TYLER. 114 Liberty St., New York City..... Jun. Feb. 2, 1887; M. Dec. 6, 1893

PUTNAM, GEORGE ROCKWELL. U. S. Coast and Geodetic Survey, Manila, Philippine Islands..... Assoc. M. Feb. 1, 1899; M. June 3, 1903

QUIMBY, HENRY HODGE. Asst. Engr., Bureau of Surveys, in Chg. of Bridge Div., 412 City Hall, Philadelphia, Pa..... Sept. 3, 1890

QUINBY, EDWIN RUFUS. City Surv., 52 Duane St., New York City.... May 4, 1904

Date of Membership.

QUINETTE DE ROCHEMONT, *Baron* EMILE THEODORE. Inspecteur Général des Ponts et Chaussées; Directeur des Phares et Balises, 18 Rue de Marignan, Paris, France ..... Jan. 3, 1894

QUINN, RICHARD. U. S. Engr. Office, Room N, Custom House, New Orleans, La ..... Mar. 2, 1904

QUINTON, JOHN HENRY. Cons. Engr., Reclamation Service, U. S. Geological Survey, Washington, D. C ..... Feb. 7, 1900

QUINTUS, JOHN CHARLES. Prin. Asst. U. S. Engr., 540 Federal Bldg., Buffalo, N. Y ..... Jan. 2, 1889

RAASLOFF, HARALD DE. 18 Burling Slip, New York City ..... Jun. Dec. 3, 1884; M. July 3, 1895

RADENHURST, WILLIAM NAPIER. Asst. Engr., Water-Works, Rochester, N. Y ..... Jun. July 7, 1875; M. July 7, 1880

RAFTER, GEORGE W. 195 Kenwood Ave., Rochester, N. Y ..... April 2, 1884

RAMSEY, JOSEPH, Jr. Pres., The Wabash R. R. Co., St. Louis, Mo .. May 1, 1889

RANDOLPH, BEVERLY STROTHER. Berkeley Springs, W. Va ..... May 2, 1888

RANDOLPH, ISHAM. Chf. Engr., San. Dist. of Chicago, Room 1010, Security Bldg., Chicago, Ill ..... Feb. 4, 1903

RANDOLPH, LINGAN STROTHER. Prof., Mech. Eng., Va. Polytechnic Inst., Blacksburg, Va ..... Jan. 2, 1890

RAYMOND, CHARLES WALKER. Brig. Gen., U. S. A. (*Retired*), 1 West 34th St., New York City ..... June 1, 1892

RAYMOND, CHARLES WARD. Min. and Cons. Engr., 1560 Sacramento St., San Francisco, Cal ..... Jun. Nov. 7, 1877; M. April 7, 1886

RAYMOND, WILLIAM GALT. Prof. of Civ. Eng. and Head of the Depts. of Eng., State Univ. of Iowa, Iowa City, Iowa ..... Oct. 3, 1894

REA, SAMUEL. Fourth Vice-Pres., P. R. R. Co., Broad St. Station, Philadelphia, Pa ..... June 4, 1884

READ, ROBERT LELAND. 68 Summer St., Malden, Mass ..... Sept. 2, 1874

REBER, HENRY LINTON. Secy. and Gen. Mgr., Kinloch Telephone Co., St. Louis, Mo ..... May 4, 1904

REDLICH, CARL. Civ. Engr. and Contr., 3 Garnison Gasse, Vienna, Austria ..... Sept. 7, 1904

REED, DAVID ABELL. Asst. Chf. Engr., Great Northern Power Co., 313 Providence Bldg., Duluth, Minn ..... Mar. 4, 1896

REED, MELVILLE EMERSON. Asst. Engr., G. N. Ry., St. Paul, Minn .. Mar. 6, 1901

REED, WENDELL MONROE. Engr., U. S. Geological Survey, in Chg. of Constr. of Hondo Reservoir Project, Roswell, N. Mex ..... Oct. 5, 1904

REED, WILLIAM BOARDMAN. Engr., M. of W. and Bldgs., New York City Ry. Co., 621 Broadway, New York City. Assoc. M. Feb. 6, 1895; M. May 1, 1901

REEVES, DAVID. Pres., The Phœnix Iron Co.; Pres., Phœnix Bridge Co., 410 Walnut St., Philadelphia, Pa ..... Jun. April 1, 1874; M. May 3, 1882

REICHMANN, ALBERT FERDINAND. Res. Engr., Am. Bridge Co., 1315 Monadnock Bldg., Chicago, Ill ..... Jun. April 30, 1895; Assoc. M. Oct. 5, 1898; M. Mar. 4, 1903

RENSHAW, ALFRED HOWARD. 500 Fifth Ave., New York City ..... June 1, 1898

		Date of Membership.
Reynders, John Van Wicheren. Supt., Bridge and Const. Dept., Pennsylvania Steel Co. (Res., 115 Pine St.), Harrisburg, Pa.	Assoc. M.	June 1, 1892
	M.	Mar. 3, 1897
Rice, George Staples. Deputy Chf. Engr., Rapid Transit R. R. Commrs., 320 Broadway, New York City		Feb. 1, 1882
Rice, Lewis Frederick. Archt. and Civ. Engr.; Asst. Engr., Am. Telephone & Telegraph Co., 125 Milk St., Boston, Mass.		Jan. 2, 1889
Rice, Walter Percival. Civ. and Cons. Engr. (The Walter P. Rice Eng. Co.), 729 Society for Savings, Cleveland, Ohio		Mar. 6, 1889
Rich, Isaac. Asst. Engr., N. Y., N. H. & H. R. R., Room 469, Terminal Station, Boston, Mass		May 6, 1903
Richards, Albert Lennox. U. S. Asst. Engr., Federal Bldg., Rock Island, Ill		Jan. 2, 1901
Richards, Hugh Tudor. Chf. Engr., San Diego East. Ry., Room 30, Keating Blk., San Diego, Cal.		Oct. 6, 1886
Richards, Joseph Thomas. Chf. Engr., of M. of W., P. R. R. Co., Broad St. Station, Philadelphia, Pa.		April 4, 1894
Richardson, Henry Brown. Mem., Mississippi River Comm., Cotton Exchange Bldg., New Orleans, La.		May 7, 1879
Richardson, Thomas Franklin. Engr., Dam and Reservoir Dept., Met. Water-Works, Clinton, Mass.		Nov. 4, 1885
Ricker, George Alfred. 702 Ellicott Sq., Buffalo, N. Y.	Jun.	April 7, 1886
	Assoc. M.	May 1, 1895
	M.	April 3, 1901
Ricketts, Louis Davidson. Cons. Engr., Globe, Ariz.		Oct. 5, 1904
Ricketts, Palmer Chamberlaine. Pres. of, and Prof. of Mechanics, Rensselaer Polytechnic Inst., Troy, N. Y.	Assoc.	Feb. 3, 1886
	M.	Oct. 5, 1887
Rickon, Frederic John Henry. Quartermaster's Dept., U. S. A., 236 Phelan Bldg., San Francisco, Cal.		Jan. 4, 1888
Ridgway, Robert. Engr., 5th Div., Rapid Transit R. R. Comm., 4 Court Sq., Brooklyn, N. Y.	Jun.	Feb. 1, 1888
	M.	June 3, 1903
Riegner, Wallace Berkley. Engr. of Bridges, P. & R. Ry., Reading Terminal, Philadelphia, Pa.		Sept. 7, 1904
Riffle, Albert Stanley. 312 N. 6th St., Albuquerque, N. Mex.		May 7, 1890
Riffle, Franklin. Mgr., Iron and Pipe Depts., Dunham, Carrigan & Hayden Co., 17 Beale St., San Francisco, Cal.		Nov. 7, 1888
Riggs, Henry Earle. Civ. and Cons. Engr. (Riggs & Sherman), 613 The Nasby, Toledo, Ohio	Assoc. M.	Oct. 4, 1893
	M.	April 1, 1896
Riggs, Morris John. Mgr., Toledo Plant, Am. Bridge Co., Toledo, Ohio.		Dec. 6, 1899
Ripley, Henry Clay. Civ. and Cons. Engr., and Contr. for Constr., Aransas Pass Jetty, Galveston, Tex.		Oct. 7, 1896
Ripley, Joseph. U. S. Asst. Engr., Sault Ste. Marie, Mich.		Sept. 4, 1901
Riser, Knud Sophus. Pres. and Chf. Engr., Grand Rapids Bridge Co., Grand Rapids, Mich.		Feb. 3, 1892
Ritchie, James. (Ritchie & Ruple, Civ. and Cons. Engrs.), 415 Chamber of Commerce, Cleveland, Ohio		Nov. 5, 1890

		Date of Membership
Rix, Edward Austin. Pres., Rix Compressed Air & Drill Co., San Francisco, Cal.		April 7, 1897
Robbins, Allan Appleton. Res. Engr., N. Y. & L. I. R. R., 1 East 42d St., New York City.	Assoc. M.	Oct. 2, 1901
	M.	Sept. 6, 1904
Roberts, Evelyn Pierrepont. Civ. and Cons. Engr., 22 William St., New York City.		May 7, 1884
Roberts, Nathaniel. Gen. Mgr., Pioneer Iron Works, 149 Pioneer St., Brooklyn, N. Y. (Res., 411 Fairmount Ave., Jersey City, N. J.)	Assoc. M.	Nov. 4, 1891
	M.	May 2, 1894
Roberts, Percival, Jr. 717 Arcade Bldg., Philadelphia, Pa.	Assoc.	May 7, 1879
	M.	June 4, 1884
Robinson, Albert Alonzo. Pres., Mex. Cent. Ry. Co., Ltd., 25 Broad St., New York City.		May 5, 1880
Robinson, Albert Fowler. Bridge Engr., A., T. & S. F. Ry. System, 1000 Railway Exchange Bldg., Chicago, Ill.		Nov. 2, 1887
Robinson, Arthur Wells. 14 Phillips Sq., Montreal, Que., Canada.		Feb. 3, 1892
Robinson, George Henry. 4 Dooly Blk., Salt Lake City, Utah.		Mar. 7, 1888
R. Robinson, Stillman Williams. Prof. Emeritus in Mech. Eng., Ohio State Univ., Columbus, Ohio.		Jan. 2, 1884
Rockwell, Samuel. Asst. Chf. Engr., L. S. & M. S. Ry., Cleveland, Ohio.		Jan. 7, 1880
Rockwood, Arthur Jones. 43 Triangle Blk., Rochester, N. Y.		Feb. 1, 1905
Rodd, Thomas. Chf. Engr., Penn. Lines W. of Pitts., Union Station, Pittsburg, Pa.		June 5, 1878
Rogers, Merritt Harrison. Cons. Engr., Tremont Hotel, Denver, Colo.		Jan. 2, 1890
Rogers, Walter Alexander. Vice-Pres., Bates & Rogers Constr. Co., 1205 Manhattan Bldg., Chicago, Ill.	Jun.	Sept. 10, 1891
	Assoc. M.	Nov. 3, 1897
	M.	April 4, 1900
Rogge, John Charles Lewis. Pres. and Mgr., Contrs. Supply Co., Watson's Lane, Westchester, New York City.	Jun.	Mar. 31, 1891
	M.	Oct. 5, 1898
Rohwer, Henry. Cons. Engr., Mo. Pac. System, (Res., 5182 Raymond Ave.), St. Louis, Mo.		April 1, 1903
Rollins, James Wingate, Jr. Pres., Holbrook, Cabot & Rollins Corporation, Boston, Mass.		Nov. 7, 1900
Rood, Henry Martyn. 163 William St., Port Chester, N. Y.		Dec. 3, 1890
Ropes, Horace. Care, George G. Humphrey, Englewood, N. J.		Sept. 2, 1903
Rose, Charles Clemons. Supt., Coal Dept., The D. & H. Co., Scranton, Pa.		April 4, 1888
Rosencrans, Edwin John. Archt. (Jackson & Rosencrans), 31 Union Sq., New York City.		May 7, 1902
Rosencrans, William Henry. With Arnold Elec. Power Station Co., Marquette Bldg., Chicago, Ill.		Oct. 5, 1898
Rosewater, Andrew. Cons. Engr.; City Engr. and Pres., Board of Public Works, Omaha, Nebr.		Oct. 3, 1883
Ross, Alexander Bell. 7 Walmer Rd., Toronto, Ont., Canada.		May 2, 1900

Date of Membership.

Ross, Douglas William. Dist. Engr., U. S. Reclamation Service, Boise, Idaho ..... Mar. 1, 1899

Ross, Florian Gaie. Farmers Bank Bldg., Pittsburg, Pa ..... Dec. 2, 1903

Ross, James. Third Floor, Liverpool, London & Globe Bldg., Montreal, Que., Canada. ..... Sept. 6, 1882

Rotch, William. Pres., Union Iron & Steel Co., 131 State St., Boston, Mass ..... Mar. 5, 1873

Roullier, Gustave Anthime. 326 Amity St., Flushing, N. Y. ..... Mar. 1, 1893

R. Rowe, Samuel McMath. Civ. and Cons. Engr., Room 364 Monadnock Bldg., Chicago, Ill ..... Sept. 2, 1885

Rowland, Charles Bradley. The Continental Iron Works, Brooklyn, N. Y ..... May 1, 1895

Rowland, Charles Leonard. Proprietor, Morton Iron Works, 102 Greene St., Brooklyn, N. Y ..... Sept. 1, 1886

Rowland, Thomas Fitch. Pres., The Continental Iron Works, Brooklyn, N. Y. (Res., 329 Madison Ave., New York City) ..... M. Dec. 4, 1867; Hon. M. Dec. 20, 1899

Rowland, Thomas Fitch, Jr. Secy. and Treas., The Continental Iron Works, Brooklyn, N. Y ..... Sept. 1, 1886

Ruddle, John. Supt. of Canals and Real Estate, The Lehigh Coal & Nav. Co., Mauch Chunk, Pa ..... Oct. 3, 1894

Ruggles, William Burroughs. Isthmian Canal Comm., Culebra, Canal Zone, Panama, Care, New York Post Office ..... April 7, 1886

Rundlett, Leonard W. Commr. of Public Works, St. Paul, Minn. .. Sept. 5, 1883

Ruple, Commodore Perry. (Ritchie & Ruple, Civ. and Cons. Engrs.), (Secy. and Treas., The C. H. Fath & Son Constr. Co.), Chamber of Commerce Bldg., Cleveland, Ohio ..... Mar. 5, 1902

Russell, Silas Bent. Cons. Civ. Engr., 417 Pine St., St. Louis, Mo ..... Jun. June 4, 1884; M. June 1, 1887

Rust, Charles Henry. City Engr., Toronto, Ont., Canada ..... April 5, 1899

Rust, Henry Bedinger. Mgr., The Rust Boiler Co., 605 German National Bank Bldg., Pittsburg (Res., 724 Wallace Ave., Wilkinsburg), Pa ..... Assoc. M. April 6, 1898; M. April 1, 1903

Ruttan, Henry Norlande. City Engr., Winnipeg, Man., Canada .... Jan. 4, 1893

Sabin, Alpheus Timothy. Engr. for MacArthur Bros. Co., 810 Fisher Bldg., Chicago, Ill ..... April 1, 1896

Sabin, Louis Carlton. Asst. Engr., Engr. Dept., U. S. A., Sault Ste. Marie, Mich ..... Assoc. M. Oct. 4, 1893; M. May 7, 1902

Sackett, John Warren. U. S. Engr. Office, Jacksonville, Fla. ..... May 2, 1894

Safford, Arthur Truman. Asst. Engr., Proprietors of Locks and Canals, 66 Broadway, Lowell, Mass ..... Sept. 6, 1899

Safford, Edward Stanley. Civ. and Cons. Engr., 143 Liberty St., Room 615, New York City ..... Dec. 6, 1882

Safford, Vinton Putnam. Mgr., Mex. North. Ry., Escalon, Chihuahua, Mexico ..... July 4, 1894

		Date of Membership.
Sample, John Henderson. 57 Ingleside Ave., Cleveland, Ohio		Oct. 6, 1886
Sanborn, Frank Berry. Prof. of Civ. Eng., Tufts Coll., Mass.		Oct. 1, 1902
Sanders, William Horatio. 915 Grand View Ave., Los Angeles, Cal.		Feb. 3, 1904
Sanderson, James Gardner. 1530 Sanderson Ave., Scranton, Pa.		July 6, 1881
Sarle, Oliver Perry. 146 Westminster St., Providence, R. I.		Jan. 2, 1901
Saunders, William Lawrence. Pres., The Ingersoll-Sergeant Drill Co., 26 Cortlandt St., New York City		Nov. 3, 1886
Savage, Hiram Newton. Superv. and Cons. Engr., U. S. Reclamation Service, Washington, D. C.; Address, Care, U. S. Reclamation Service, Denver, Colo.	Assoc. M. M.	Mar. 7, 1894 Oct. 7, 1896
Saville, Caleb Mills. Div. Engr., Distrib. Dept., Met. Water-Works, 1 Ashburton Pl., Boston, Mass.	Assoc. M. M.	Nov. 6, 1895 Jan. 2, 1901
Sawyer, Edward. 100 Bellevue St., Newton, Mass.		Oct. 2, 1895
Sax, Percival Mosley. Engr. and Contr., 1328 Chestnut St., Philadelphia, Pa.	Jun. Assoc. M. M.	Jan. 31, 1893 Jan. 3, 1900 April 3, 1901
Scaife, William Lucien. Chairman, Scaife Foundry & Machine Co., Ltd., 28th St., Pittsburg, Pa		Dec. 3, 1890
Scarborough, Francis Winthrop. Engr., M. of W., C. & O. Ry., Richmond, Va	Jun. Assoc. M. M.	Sept. 3, 1890 Mar. 6, 1895 Feb. 2, 1904
Schall, Frederick Edward. Bridge Engr., L. V. R. R., South Bethlehem, Pa		Oct. 1, 1902
Schaub, Julius William. Cons. Engr., 1650 Monadnock Blk., Chicago, Ill	Jun. M.	Nov. 5, 1884 Oct. 6, 1886
Schermerhorn, Louis Younglove. Pres., Am. Dredging Co., 510 Mariner and Merchant Bldg., Philadelphia, Pa.		May 5, 1897
Scherzer, Albert John. Santa Ana, Salvador		Jan. 6, 1886
Schmidt, Max Eberhardt. Gen. Mgr. and Chf. Engr., Continuous Transit Securities Co., 45 Broadway, New York City		May 7, 1879
R. SCHNEIDER, CHARLES CONRAD. (*President*). Cons. Engr., N. W. Cor. 15th and Chestnut Sts., Philadelphia, Pa.		Feb. 6, 1884
Schofield, Hiram Abif. Dist. Mgr., Pittsburg Testing Laboratory, Ltd., Room 906, Crozer Bldg., Philadelphia, Pa.		Oct. 7, 1896
Schultz, Albert Louis. Cons. Engr., 1210 Keystone Bldg., Pittsburg, Pa.		Sept. 4, 1901
Schultze, Paul. City Engr., Utica, N. Y.	Assoc. M. M.	Nov. 2, 1898 June 5, 1901
R. Schuyler, James Dix. Cons. Hydr. Engr., 1211 Braly Bldg., Los Angeles, Cal.		Dec. 6, 1882
Scofield, Glenn Mason. Secy. and Treas., The Scofield Co., 906 Pennsylvania Bldg., Philadelphia, Pa.		Sept. 7, 1904
Scott, Addison Moffat. Charleston on Kanawha, W. Va.		June 2, 1886
Scott, Ernest Kay. Care, Hoover & Mason, 1407 Railway Exchange, Chicago, Ill.		Mar. 2, 1898
Scovill, Edward Tracy. Dansville, N. Y.		Sept. 6, 1876

	Date of Membership.
Scripture, Arthur Marquis. New Hartford, N. Y..... { Assoc. M.	June 3, 1896
{ M.	Jan. 5, 1904
Seaman, Henry Bowman. Cons. Engr., 40 Wall St., New York City..... { Jun.	June 2, 1886
{ M.	Dec. 7, 1887
Searles, William Henry. Cons. Civ. Engr., Elyria, Ohio.....	July 2, 1873
Sears, Alfred Francis. 193½ North Union Ave., Portland, Ore.....	June 2, 1869
Sears, Walter Herbert. Div. Engr., N. Y. Aqueduct Commrs., Croton River Div., Katonah, N. Y.....	Oct. 5, 1904
Seaver, John Wright. Vice-Pres., The Wellman-Seaver-Morgan Co., New England Bldg., Cleveland, Ohio	Nov. 6, 1901
N. Seddon, James Alexander. 906 Security Bldg., Chicago, Ill	Nov. 2, 1898
Sellers, Coleman. 1301 Stephen Girard Bldg., Philadelphia, Pa.....	May 3, 1876
Sengoku, Mitsugu. The Kiushiu Ry., Moji, Kiushiu, Japan.....	June 4, 1890
Sergeant, George, Jr. Prin. Asst. Engr., Atlantic Ave. Impvt., L. I. R. R., 5 Hanson Pl., Brooklyn, N. Y	April 2, 1902
Serjeant, Hugh. Res. Engr., Western Australian Govt. Rys., Northam, Western Australia.....	Dec. 4, 1901
Seurot, Paul Albert. Office Engr., North River Div., Penn., N. Y. & L. I. R. R. Co., 1 West 34th St., New York City..... { Jun.	April 30, 1895
{ Assoc. M.	Oct. 4, 1899
{ M.	Nov. 1, 1904
Seymour, Horatio. 34 Winston Bldg., Utica, N. Y..... { Assoc.	Jan. 8, 1873
{ M.	April 7, 1880
Shailer, Robert Ames. Pres., Boston Tunnel Constr. Co., 23 Lewis St., East Boston, Mass.....	Mar. 3, 1880
Shankland, Edward Clapp. (E. C. & R. M. Shankland, Civ. Engrs.), 1106 Rookery, Chicago, Ill.....	Feb. 5, 1890
Shankland, Ralph Martin. 1106 Rookery Bldg., Chicago, Ill.....	Mar. 1, 1899
Shanly, James Moore. Contr. Engr., 346 Prince Arthur St., Montreal, Que., Canada.	July 6, 1887
Shaw, Granville Wheaton. U. S. Asst. Engr., P. O. Box 496, Louisville, Ky.....	Oct. 5, 1887
Shaw, Sumner Farnham. Chf. Engr., Guatemala R. R., Sanarate, Guatemala.....	Oct. 3, 1894
Shearwood, Frederick Perry. Dominion Bridge Co., Montreal, Que., Canada.....	Oct. 7, 1903
Shedd, Edward Whitten. Civ. and Hydr. Engr., Providence, R. I..	May 6, 1903
Shedd, Joel Herbert. Cons. Engr., Providence, R. I.....	Sept. 15, 1869
Shenehon, Francis Clinton. U. S. Asst. Engr., 33 Campau Bldg., Detroit, Mich.....	May 7, 1902
Shepard, David Chauncey. St. Paul, Minn.....	May 2, 1883
Sherman, Charles Winslow. With Leonard Metcalf, Cons. Engr., 14 Beacon St., Boston, Mass ..... { Jun.	Oct. 8, 1891
{ Assoc. M.	May 2, 1900
{ M.	Feb. 4, 1903
Sherman, Herbert Ellwood. Asst. Engr. in Chg. of Dept. of Street Lines, City Engr.'s Office, Providence, R. I..... ..	May 7, 1900
Sherman, Richard Willette. Pres., Troy Public Works Co., Room 67, City Bank Bldg., Utica, N. Y.....	Oct. 6, 1896

		Date of Membership.
SHERRERD, MORRIS ROBESON. (*Director*). Engr. and Supt., Dept. of Water, 128 Halsey St., Newark, N. J.	Assoc. M.	May 3, 1893
	M.	May 6, 1896
SHIRAISHI, NAOJI. 71 Miyamura-cho, Azabu, Tokyo, Japan		Oct. 4, 1899
SHMELEFF, THEODOR SEMENOVITCH. Sotschi, Caucasus, Russia		Sept. 7, 1892
SIBERT, WILLIAM LUTHER. Maj., Corps of Engrs., U. S. A., P. O. Box 1240, Pittsburg, Pa		June 2, 1897
SIMPSON, GEORGE FREDERIC. Asst. Engr., Rapid Transit R. R. Comm., 318 West 135th St., New York City		Mar. 2, 1887
SIMPSON, GEORGE HUME. 6723 McPherson St., Pittsburg, Pa		Oct. 6, 1880
SIMS, ALFRED VARLEY. Wenonda, Pittsylvania Co., Va		Mar. 4, 1896
SIMS, CLIFFORD STANLEY. Gen. Mgr., B. & O. R. R., B. & O. Central Bldg., Baltimore, Md		April 1, 1903
SIMSON, DAVID. Gen. Mgr., Buenos Aires West. Ry., P. O. Box 741, Buenos Aires, Argentine Republic		Jan. 8, 1902
SINCLAIR, FRANK OSCAR. City Engr., Burlington, Vt		Nov. 6, 1901
SIRRINE, JOSEPH EMORY. Box 98, Greenville, S. C	Jun.	June 20, 1893
	Assoc. M.	May 4, 1898
	M.	May 6, 1903
SJÖSTRÖM, IVAR LUDWIG. Cons. Engr.; Agt., The Lawrence Dye Works Co., Lawrence, Mass.	Jun.	Sept. 6, 1892
	M.	Sept. 1, 1897
SKILTON, GEORGE STEELE. Asst. Engr., Dept. of Water Supply, Gas and Electricity of City of New York, Borough of Brooklyn (Res., Rockville Centre), N. Y.		Sept. 7, 1881
SKINNER, FRANK WOODWARD. Associate Editor of *The Engineering Record*, 114 Liberty St., New York City		Sept. 1, 1886
SLATAPER, FELICIAN. Via S. Vito 20, Trieste, Austria		Sept. 15, 1869
SLEEPER, GEORGE EDWARD. 35 Lorraine St., Roslindale Station, Boston, Mass		Feb. 3, 1904
SLOAN, DAVID. Chf. Engr., MacArthur Bros. Co., 810 Fisher Bldg., Chicago, Ill		Jan. 1, 1896
SLOCUM, CHARLES MILLS. City Engr.'s Office, Springfield, Mass		May 5, 1897
SMEAD, RAPHAEL CHART. U. S. Asst. Engr., 2728 Pennsylvania Ave., N. W., Washington, D. C		Feb. 1, 1905
SMITH, ALBERT MATHER. Engr. of Distrib., Consolidated Gas Co. of N. Y., 4 Irving Pl., New York City		May 5, 1886
SMITH, AUGUSTUS. Engr. and Contr., 39 Cortlandt St., New York City		June 4, 1902
SMITH, CHARLES WILLIAM. 393 Lewis Ave., Brooklyn, N. Y.	Assoc. M.	April 5, 1893
	M.	Dec. 1, 1903
SMITH, EDWIN FOSTER. Cons. Hydr. Engr., 4102 Locust St., Philadelphia, Pa		June 5, 1895
SMITH, EUGENE RAYMOND. Islip, Suffolk Co., N. Y.	Jun.	May 2, 1888
	M.	May 1, 1901
SMITH, HENRY CLEMENT. Div. Engr., Phila. Div., P. & R. Ry., Philadelphia, Pa		Oct. 2, 1901
SMITH, HENRY DEWITT. Asst. Engr., K. C. S. Ry. Co., Marshall, Tex.		Dec. 6, 1893

Date of Membership.

SMITH, JONAS WALDO. Chf. Engr., Aqueduct Commrs., 280 Broadway, New York City. Assoc. M. Oct. 5, 1892; M. April 5, 1899

SMITH, JOSEPH SHUTER. Care, Robt. S. Perry, 5104 Pulaski Ave., Germantown, Philadelphia, Pa. April 1, 1874

SMITH, LEONARD CHARLES LINDSAY. Asst. Engr., Dept. of Water Supply, Gas and Electricity, 59 Woolsey St., Long Island City, N. Y. Mar. 6, 1901

SMITH, MILLER ARMSTRONG. Cons. and Contr. Engr. (Smith & Davis), Aguiar 81, Havana, Cuba. Oct. 6, 1886

SMITH, OBERLIN. Pres., Ferracute Machine Co., "Lochwold," Bridgeton, N. J. Sept. 3, 1884

SMITH, STEWART KEDZIE. Billings, Mont. April 6, 1904

SMITH, T. GUILFORD. Mgr. of Sales, Carnegie Steel Co., Pittsburg, U. S. Steel Products Export Co., N. Y., Illinois Steel Co., Chicago; 203A Ellicott Sq., Buffalo, N. Y. Sept. 6, 1871

SMITH, WILLIAM CHARLES. 339 Wilder Ave., St. Paul, Minn. Sept. 4, 1901

SMITH, WILLIAM SOOY. Monadnock Blk., Chicago, Ill. Jan. 17, 1872

SMOOT, EDGAR KENNETH. Engr. and Contr., Manzanillo Harbor Works, 2a Ave. Balderas 814, City of Mexico, Mexico. Feb. 2, 1898

SNOOK, THOMAS EDWARD. 261 Broadway, New York City. Mar. 3, 1897

SNOW, CHARLES HENRY. Dean, School of Applied Science, New York Univ., New York City. Assoc. M. Feb. 1, 1893; M. Sept. 2, 1896

SNOW, FRANK HERBERT. (Snow & Barbour, Civ. and San. Engrs.), Tremont Bldg., Boston, Mass. Assoc. M. June 4, 1895; M. May 3, 1904

SNOW, FRANKLIN AUGUSTUS. Contr. for Public Works, The Master Bldr.'s Assoc., 166 Devonshire St., Boston, Mass. Jan. 4, 1905

SNOW, JONATHAN PARKER. Bridge Engr., B. & M. R. R., Boston, Mass. June 3, 1885

SNOW, WILLIAM PLINY. Constr. Engr., with Lockwood, Greene & Co., Boston, Auburndale, Mass. Feb. 5, 1902

SNYDER, BAIRD, Jr. Asst. Supt., Lehigh Coal & Nav. Co., Lansford, Pa. Mar. 2, 1904

SNYDER, CHRISTOPHER HENRY. Contr. Mgr., San Francisco Office of Milliken Bros., New York, 413 Rialto Bldg., San Francisco, Cal. Oct. 2, 1901

SNYDER, GEORGE DUNCAN. Care, Jacobs & Davies, 128 Broadway, New York City. Assoc. M. Nov. 6, 1895; M. Sept. 4, 1901

SOMERVILLE, ROBERT. Asst. Chf. Engr., Board of Miss. Levee Commrs., Greenville, Miss June 1, 1887

SONNE, OTTO. (P. O. Box 3051), 68 Devonshire St., Boston, Mass. Sept. 7, 1887

SOOYSMITH, CHARLES. Cons. Engr., 71 Broadway, New York City. May 5, 1886

SORZANO, JULIO FEDERICO. Cons. Engr., 228 Garfield Pl., Brooklyn, N. Y. Sept. 3, 1884

SOUDER, HARRISON. Cons. Engr., 303 Harrison Bldg., Philadelphia, Pa. Jan. 6, 1904

SOULE, HOWARD. Syracuse, N. Y. Mar. 17, 1869

SPALDING, FREDERICK PUTNAM. Prof. of Civ. Eng., Univ. of Missouri, 807 Virginia Ave., Columbia, Mo. Dec. 2, 1891

SPENCER, JOHN CLARK. Cons. and Contr. Engr., Room 35, Mercantile Bank Bldg., Cleveland, Ohio. Assoc. M. May 6, 1896; M. Dec. 6, 1904

Date of Membership.

SPENCER, SAMUEL. 80 Broadway, New York City..... Sept. 2, 1885

SPERRY, HENRY MUHLENBERG. Signal Engr. and Agt., The Union Switch & Signal Co., 143 Liberty St., New York City..... Nov. 6, 1901

SPICER, VIBÉ KIERULFF. Western Mgr., The Union Switch & Signal Co., 1535 Monadnock Blk., Chicago, Ill..... June 5, 1895

SPILSBURY, EDMUND GYBBON. Cons. Engr., 216 West State St., Trenton, N. J..... Dec. 7, 1892

SPOONER, ALLEN NEWHALL. Dept., Docks and Ferries, Foot 24th St., East River (Res., 212 East 12th St.), New York City..... Dec. 5, 1900

SPRAGUE, FRANK JULIAN. Cons. Engr., 20 Broad St., New York City.. June 1, 1904

SPRING, FRANCIS JOSEPH EDWARD. Chairman, Harbor Trust Board, Madras Club, Madras, India..... Jan. 3, 1894

STAATS, JOHN HENRY. Vice-Pres. and Treas., R. P. & J. H. Staats, Engrs. and Contrs., 29 Broadway, New York City..... Mar. 5, 1884

STAATS, ROBERT PARKER. (R. P. & J. H. Staats, Civ. Engrs. and Contrs.), 29 Broadway, New York City..... { Jun. Nov. 3, 1875 / M. July 1, 1885

STACPOOLE, STEPHEN WESTROPP. Cons. Engr., 3a Avenida de la Libertad 5, Orizaba, Vera Cruz, Mexico..... { Assoc. M. May 6, 1896 / M. Sept. 4, 1901

STALEY, CADY. Care, Case School of Applied Science, Cleveland, Ohio. Mar. 17, 1869

STANFORD, HOMER REED. Civ. Engr., U. S. N., Navy Yard, Pensacola, Fla..... { Jun. Oct. 1, 1890 / Assoc. M. Nov. 7, 1894 / M. Sept. 4, 1901

STANIFORD, CHARLES WILKINSON. 30 Berkeley Pl., Brooklyn, N. Y.... May 7, 1890

STANTON, FRANK MCMILLAN. Min. Engr., Atlantic Mine, Mich..... Feb. 1, 1899

STANTON, ROBERT BREWSTER. Cons., Civ. and Min. Engr., 66 Broadway, New York City..... Sept. 1, 1880

STARRETT, MILTON GERRY. Chf. Engr., New York City Ry., 621 Broadway, New York City..... Jan. 3, 1900

STAUFFER, DAVID MCNEELY. Vice-Pres., Eng. News Pub. Co., St. Paul Bldg., New York City..... Sept. 2, 1874

N. STEARNS, FREDERIC PIKE. Chf. Engr., Met. Water and Sewerage Board, 1 Ashburton Pl., Boston, Mass..... Oct. 2, 1878

STEARNS, IRVING ARIEL. Pres., Coxe Bros. & Co. (Inc.); Pres., Del., Susq. & Schuylkill R. R. Co., 143 Liberty St., New York City (Res., Wilkesbarre, Pa.)..... April 2, 1884

STEECE, EMMET ABNER. Burlington, Iowa..... { Assoc. M. Dec. 4, 1901 / M. Mar. 1, 1904

STEELE, HENRY MAYNADIER. Chf. Engr., Cent. of Ga. Ry. Co., Savannah, Ga..... { Assoc. M. April 5, 1893 / M. Dec. 6, 1899

STEPHENS, CLINTON F. Riverside, Mo..... Sept. 5, 1877

STERN, EUGENE WASHINGTON. Cons. Engr., 7 West 38th St., New York City..... Mar. 3, 1897

STEVENS, FRANK STODDARD. Supt., P. & R. Ry., Reading, Pa .. .... Oct. 3, 1883

STEVENS, HORACE EDWARD. Director, Winston Bros. Co., Contrs., Minneapolis, Minn..... { Jun. Nov. 1, 1876 / M. April 4, 1888

STEVENS, JOHN FRANK. Second Vice-Pres., C., R. I. & P. System, Chicago, Ill..... June 6, 1888

Date of Membership.

STEWART, JOHN MUIRHEAD. Asst. Engr., Dept. of Docks and Ferries, East 24th St. Office, New York City..... Jun. Mar. 2, 1887; M. Jan. 4, 1888

STILLWELL, LEWIS BUCKLEY. Cons. Elec. Engr., Park Row Bldg., New York City..... Oct. 2, 1901

STITES, ARCHER COCHRAN. Care, John V. Norcross, Marquette Bldg., Chicago, Ill..... Jun. Dec. 3, 1890; Assoc. M. Nov. 4, 1891; M. May 6, 1896

STODDARD, GEORGE CALEB. Civ. and San. Engr., 215 West 125th St., New York City..... April 4, 1900

N. STONE, EDWARD HERBERT. Freshford, Somerset, England..... Dec. 5, 1888

STONE, EVERETT EDWARD. Asst. Chf. Engr., B. & A. R. R., Springfield, Mass..... May 4, 1904

STOREY, WILLIAM BENSON, Jr. Chf. Engr., A., T. & S. F. Ry., Topeka, Kans..... Jan. 2, 1889

STORROW, SAMUEL. Civ. and Min. Engr., 401 Douglas Bldg., Los Angeles, Cal..... Jun. Sept. 10, 1891; Assoc. M. Oct. 2, 1895; M. Mar. 1, 1904

STOWELL, CHARLES FREDERICK. (Stowell & Cunningham), 51 State St., Albany, N. Y..... April 4, 1888

STRACHAN, JOSEPH. Asst. Engr., Bureau of Highways, 352 Putnam Ave., Brooklyn, N. Y..... Assoc. M. May 4, 1892; M. May 4, 1898

STREHLOW, OSCAR EMIL. Engr. and Supt. for Scribner & Heyworth, Gen. Contrs., Chicago, Ill.; Address, P. O. Box 2, South Bend, Ind..... Assoc. M. Mar. 6, 1901; M. Sept. 6, 1904

STRICKLER, GRATZ BROWN. Gen. Supt., Richardson & Burgess, Inc., Colorado Bldg., Washington, D. C.. Jun. Jan. 5, 1897; Assoc. M. Jan. 4, 1899; M. Nov. 1, 1904

STROBEL, CHARLES LOUIS. Cons. and Contr. Engr., 1744 Monadnock Blk., Chicago, Ill..... Dec. 3, 1879

STRONG, MASON ROMEYN. Bridge Engr., Erie R. R. System, 237 Lexington Ave., Passaic, N. J..... Mar. 6, 1901

STUART, ALFRED ALLEN. Mgr. for M. P. Davis, Constr. of Wheel Pit, Niagara Falls, Ont., Canada..... Oct. 7, 1891

STUART, FRANCIS LEE. Engr. of Surveys, B. & O. R. R., Mt. Royal Station, Baltimore, Md.. ..... May 3, 1899

STUART, JOSEPH THOMPSON. Contr. (Brann & Stuart), 1625 North 16th St., Philadelphia, Pa..... May 4, 1904

STUBBS, LINTON WADDELL. Asst. Engr., S. P. R. R., 1729 Coliseum Pl., New Orleans, La..... Oct. 3, 1888

STURTEVANT, CARLETON WILLIAM. Engr. with The Atlantic, Gulf & Pacific Co., Park Row Bldg., New York City; Address, Scranton, Miss..... Oct. 2, 1901

SUBLETTE, GEORGE WASHINGTON. 2616 First Ave., South, Minneapolis, Minn..... Oct. 1, 1902

SUHR, OTTO BRUNO. Engr. in Chg., The Ontario Power Co., Box 176, Niagara Falls, Ont., Canada..... June 1, 1904

Date of Membership.

SULLIVAN, JOHN G. Div. Engr., Constr. Dept., C. P. Ry., Gen. Offices, Winnipeg, Man., Canada ..... Sept. 6, 1899

SUMNER, HORACE AUGUSTUS. Chf. Engr., Denver, N. W. & Pac. Ry., Room 717, Majestic Bldg., Denver, Colo ..... Oct. 4, 1899

SUNDSTROM, CARL ALFRED. Surv. and Regulator, 8th Survey Dist., Dept. of Public Works, Philadelphia; Office, 4444 Main St., Manayunk, Philadelphia, Pa ..... Oct. 3, 1894

SUPPLEE, JESSE. Mgr., The Supplee Eng. Co., 1019 State St. (Res., 646 West 9th St)., Erie, Pa ..... June 3, 1903

SUTER, CHARLES RUSSELL. Col., Corps of Engrs., U. S. A., Army Bldg., 39 Whitehall St., New York City ..... April 1, 1896

SUTERMEISTER, ARNOLD HENRY. Engr., State R. R. Comm., 293 Washington Ave., Albany, N. Y ..... June 3, 1902

SWAIN, GEORGE FILLMORE. Prof. of Civ. Eng., Mass. Inst. Tech.; Engr., Mass. R. R. Comm.; Mem., Boston Transit Comm.; Mass. Inst. Tech., Boston, Mass.....
Assoc. Sept. 5, 1883
M. Mar. 2, 1892

SWANKER, JOHN EDWARD. Gen. Mgr., Tees Side Bridge & Eng. Works, Ltd., Middlesbrough, England ..... May 4, 1904

SWENSSON, EMIL. Cons. and Constr. Engr., 925 Frick Bldg., Pittsburg, Pa ..... June 7, 1893

SWINBURNE, GEORGE WAY. Civ. and San. Engr. (Swinburne & Clark), 156 Fifth Ave., New York City ..... May 7, 1902

SYMONS, THOMAS WILLIAM. Lt.-Col., Corps of Engrs., U. S. A., 20 Lafayette Sq., Washington, D. C ..... Oct. 3, 1894

TALBOT, ARTHUR NEWELL. Prof. of Municipal and San. Eng., Univ. of Illinois, Urbana, Ill ..... April 4, 1888

TALBOTT, HARRY ELSTNER. Civ. Engr. and Gen. Contr., Dayton, Ohio. June 6, 1900

TALCOTT, HARRY RANDOLPH. Asst. Engr., B. & O. R. R., Room 8, Walsh Bldg., Cumberland, Md ..... Oct. 5, 1904

TATNALL, GEORGE. Civ. and Cons. Engr., 1411 Harrison St., Wilmington, Del ..... May 3, 1899

TAUSSIG, HUBERT PRIMM. Cons. Civ. Engr., 14th and Locust Sts., St. Louis, Mo ..... Oct. 3, 1894

TAYLOR, BENJAMIN HENRY. Chf. Engr., Carnegie Steel Co., Pittsburg, Pa ..... May 4, 1904

TAYLOR, EDWARD BALLINGER. Fourth Vice-Pres., Penn. Co. and Pitts., Cin., Chic. & St. L. Ry. Co., Union Station, Pittsburg, Pa..... Sept. 3, 1884

TAYLOR, HARRY. Capt., Corps of Engrs., U. S. A., Engr. Officer, Dept. of Luzon, Manila, Philippine Islands..... Oct. 7, 1896

TAYLOR, JAMES TOWNSEND. Cons. Hydr. Engr., Honolulu, Hawaii.... Jan. 3, 1894

TAYLOR, LUCIAN ARNOLD. Cons. Engr., 719 Tremont Bldg., Boston, Mass..... Nov. 4, 1891

TAYLOR, SAMUEL ALFRED. Cons. Civ. and Min. Engr., 900 Lewis Blk., Pittsburg, Pa..... Oct. 7, 1903

TAYLOR, THOMAS ULVAN. Prof. of Civ. Eng., Univ. of Texas, Austin, Tex.....
Assoc. Jan. 31, 1893
Assoc. M. Oct. 2, 1895
M. Oct. 2, 1901

Date of Membership.

Taylor, William Dana. Prof., Railway Eng., Univ. of Wisconsin; Engr., Wisconsin State Board of Assessment, 430 Sterling Pl., Madison, Wis. ..... Mar. 1, 1899

Tays, Eugene Augustus Hoffman. Cons. Min. Engr., Fuerte, Sinaloa, Mexico ..... April 6, 1898

Teichman, Frank. Care, U. S. Geological Survey, Livingstone, Ariz. Oct. 5, 1904

Teilman, Ingvart. 1123 K St., Fresno, Cal. ..... June 3, 1903

Temple, John Charles. Hydr. Engr., 2221 Land Title Bldg., Philadelphia, Pa. ..... May 4, 1898

Temple, William Henry Giles. Civ. and Hydr. Engr., 75 Westminster St., Providence, R. I. ..... Feb. 3, 1892

Terry, Edward Clinton. Hartford, Conn. ..... Feb. 6, 1895

Thacher, Edwin. Cons. Engr. and Mem., Concrete Steel Eng. Co., Park Row Bldg., New York City ..... Feb. 17, 1869

Thackray, George Edward. Structural Engr., Cambria Steel Co., Johnstown, Pa. ..... { Jun. Sept. 6, 1882 / M. April 7, 1886

Thayer, Russell. United Gas Impvt. Co., Broad and Arch Sts., Philadelphia, Pa. ..... Dec. 6, 1882

N. Thomas, Benjamin Franklin. Supt., Constr., Dam 37, Home City, Ohio ..... April 6, 1887

Thomas, George Edward. Superv. Engr., I. B. R. T., 59th St. Power House (Res., 50 West 92d St.), New York City ..... Oct. 5, 1898

Thompson, Benjamin. 41 First National Bank Bldg., Chattanooga, Tenn. ..... July 3, 1889

Thompson, Ellis Dunn. 720 Land Title Bldg., Philadelphia, Pa. .... Feb. 1, 1899

Thompson, Fred. Civ. Engr., U. S. N., Navy Yard, Norfolk, Va. .... Oct. 1, 1902

Thompson, Gaylord. Gen. Mgr., Beaver Val. Traction Co., P. O. Box 643, Beaver, Pa. ..... April 2, 1890

Thompson, Henry Clark. Div. Engr., N. Y. C. & H. R. R. R., West 42d St. Ferry, New York City ..... Feb. 4, 1903

Thompson, Samuel Clarence. Engr. of Highways, Municipal Bldg., Bronx (Res., 950 East 166th St.), New York City ..... Feb. 6, 1889

Thompson, William Andrew. U. S. Asst. Engr., La Crosse, Wis. .... Oct. 7, 1896

Thomson, Ernest Burslem. U. S. Asst. Engr., Miami, Fla. ..... { Assoc. M. June 5, 1901 / M. May 31, 1904

Thomson, George Huntington. Civ. and Cons. Engr., Care, Transportation Club, 42d St. and Madison Ave., New York City ..... Feb. 2, 1887

Thomson, John. 253 Broadway, New York City ..... Mar. 2, 1887

Thomson, Reginald Heber. City Engr., 701 Yesler Way, Seattle, Wash. ..... Dec. 2, 1903

Thomson, Thomas Kennard. Cons. Engr., Park Row Bldg., New York City ..... { Jun. Oct. 3, 1888 / Assoc. M. June 3, 1891 / M. Dec. 4, 1895

Thornhill, Edward Baylies. Chf. Engr., L. & N. W. Ry., Euston Station, London, England ..... Oct. 7, 1903

Tibbals, George Attwater. The Continental Iron Works, Brooklyn, N. Y. ..... { Jun. May 2, 1888 / M. Mar. 4, 1896

Date of Membership.

TIBBALS, SAMUEL GAYLORD. The Continental Iron Works, Brooklyn, N. Y. — Jun. May 2, 1888; M. May 5, 1897

TIGHE, JAMES LAWRENCE. City Engr. and Engr., Holyoke Water-Works, Holyoke, Mass. — Assoc. M. Oct. 5, 1898; M. May 31, 1904

TILL, JOSEPH. Freeburgh, Houston Co., Minn. — Oct. 4, 1899

TILLSON, GEORGE WILLIAM. Chf. Engr., Bureau of Highways, Room 12, Municipal Bldg., Brooklyn, N. Y. — Oct. 7, 1896

TIMONOFF, VSEVOLOD EVGUENIEVITCH. Prof. of the Inst. of Ways of Communication; Director of Ways of Communication, Dist. of St. Petersburg; Mem. of the Technical Council of the Direction of Commercial Harbors and Navigation, Perspective Zabalkanski 9, St. Petersburg, Russia. — May 3, 1893

TINGLEY, RICHARD HOADLEY. Pres. and Chf. Engr., The R. H. Tingley Co., Cons. Engrs., 29 Broadway, New York City (also 75 Westminster St., Providence, R. I.). — April 3, 1901

TINKHAM, SAMUEL EVERETT. Asst. Engr., Eng. Dept., City Hall, Boston, Mass. — Mar. 2, 1892

TINTORER Y GIBERGA, JOSEPH. Claris 32, Barcelona, Spain. — May 5, 1880

TITTMANN, OTTO HILGARD. U. S. Coast & Geodetic Survey, Washington, D. C. — June 4, 1902

TODD, FRANK HERBERT. Cons. Engr. (Sturtevant & Todd), 1208 Fisher Bldg., Chicago, Ill. — Feb. 6, 1889

TOLLINGER, EDWARD CHANDLER. U. S. Asst. Engr., Greenville, Miss. — June 4, 1902

TOMLINSON, ALFRED THOMAS. Asst. Civ. Engr., J. G. White & Co., 43 Exchange Pl. New York City. — Sept. 7, 1887

TOMLINSON, SAM. 1 Raffles Pl., Singapore, Straits Settlements. — April 6, 1892

TOMPSON, GEORGE MORRIS. Civ. and Cons. Engr., 6 Beacon St., Room 602, Boston, Mass. — May 2, 1888

TONE, SUMNER LA RUE. Second Vice-Pres., Pittsburg Rys. Co., Allegheny County Light Co., 5607 Howe St., Pittsburg, Pa. — Dec. 4, 1901

TÖNNESEN, TOBIAS. Kontroll-Ingenieur, Otavi Minen- und Eisenbahn-Gesellschaft, Swakopmund, German S. W. Africa. — May 1, 1901

TOUCEDA, ENRIQUE AUGUSTO. 51 State St., Albany, N. Y. — Jan. 3, 1900

TOWL, FORREST MILTON. Gen. Supt., National Transit Co., 26 Broadway, New York City. — Feb. 5, 1896

TOWLE, STEVENSON. Civ. and Cons. Engr., 7 East 42d St., New York City. — Feb. 19, 1868

TOWNSEND, CURTIS MCDONALD. Maj., Corps of Engrs., U. S. A., Manila, Philippine Islands. — Nov. 1, 1893

TRASK, FRANK ELLSWORTH. Cons. Civ. and Hydr. Engr., 405 Douglas Bldg., Los Angeles, Cal. — Assoc. M. June 5, 1895; M. Jan. 2, 1901

TREADWELL, LEE. U. S. Navy Yard, Portsmouth, N. H. — Jun. Nov. 5, 1890; Assoc. M. Oct. 4, 1893; M. Dec. 2, 1896

TRETTER, GUSTAV ADOLPH. Asst. Supt. and Asst. Engr., Erecting Dept., Phœnix Bridge Co., Phœnixville, Pa. — April 6, 1904

Date of Membership.

TRIBUS, LOUIS LINCOLN. Cons., Civ. and Hydr. Engr. (Tribus & Massa), 84 Warren St., New York City; also Commr. of Public Works, Borough of Richmond, City of New York..... Jun. April 4, 1888; Assoc. M. June 1, 1892; M. April 1, 1896

TRIEST, WOLFGANG GUSTAV. Vice-Pres., The Snare & Triest Co., 39 Cortlandt St., New York City..... Jun. Sept. 3, 1890; Assoc. Mar. 6, 1900; M. Jan. 31, 1905

TROCON, ALBERT ALEXANDER. (The Midland Bridge Co., Freygang & Trocon, Proprs.), Kansas City, Mo..... May 1, 1895

TROTTER, ALFRED WILLIAMS. 141 Broadway, New York City... Jun. Sept. 5, 1883; M. Nov. 7, 1894

TRUNDLE, HORATIO HARTLEY. Civ. Engr. and Contr., Leesburg, Va..... Assoc. M. June 7, 1899; M. Mar. 6, 1901

TSUJI, TARO. Engr., Govt. Ry. Office, 24 Hongo Umicho Nichome, Tokyo, Japan..... Jun. Oct. 8, 1891; Assoc. M. Oct. 4, 1899; M. Mar. 1, 1904

TUBBS, JOSEPH NELSON. Gen. Insp., State Dept. of Public Works, 57 Rutgers St., Rochester, N. Y..... Sept. 3, 1884

TUCKER, LESTER WALDO. Asst. Engr., Delaware & Hudson Co., Schenectady, N. Y..... Dec. 4, 1901

TUCKER, ROSS FRANCIS. Pres., Tucker & Vinton, Inc., 156 Fifth Ave., New York City..... Oct. 7, 1903

TUCKEY, THOMAS WILLIAM TOWNSEND. Dist. Engr., Imperial Rys. of North China, Tientsin, China..... June 3, 1903

TURNER, CLAUDE ALLEN PORTER. Engr. and Archt., 816 Phœnix Bldg., Minneapolis, Minn..... Mar. 6, 1901

TURNER, EDMUND KIMBALL. 53 State St., Boston, Mass..... Nov. 4, 1891

TURNER, NATHANIEL. 53 B. Calle de Ocampo, Monterey, N. L., Mexico. Mar. 6, 1895

TUSKA, GUSTAVE ROBITSCHER. Cons. Engr., 62 William St., New York City..... Jun. Mar. 6, 1894; Assoc. M. Jan. 1, 1896; M. Nov. 2, 1900

TUTEIN-NOLTHENIUS, RUDOLPH PETER JOHANN. Heerengracht No. 132, Amsterdam, The Netherlands..... Dec. 6, 1899

TUTHILL, JOB. Bridge Engr., Pere Marquette R. R., Detroit, Mich..... Jun. June 6, 1888; M. Oct. 4, 1893

TUTTLE, ARTHUR SMITH. Prin. Asst. Engr., Board of Estimate and Apportionment, 277 Broadway, New York City..... Jun. Mar. 2, 1887; Assoc. M. May 2, 1894; M. Mar. 2, 1898

TUTTON, CHARLES HAROLD. Asst. Engr., Dept. Public Works, Room 13, City Hall, Buffalo, N. Y..... Oct. 2, 1901

TUTWILER, THOMAS HENRY. Engr. in Chg. of Constr., Nashville Ry. & Light Co., for Ford, Bacon & Davis, 331 N. College St., Nashville, Tenn..... June 4, 1902

TWYMAN, AARON. Engr., Constr. Dept., The Pullman Co., 5 Florence Boulevard, Pullman, Ill..... Mar. 2, 1898

Date of Membership.

TYE, WILLIAM FRANCIS. Chf. Engr., Canadian Pacific Ry., Montreal, Que., Canada ..... Sept. 1, 1897

TYSON, ANDERSON HARVEY. Glenridge, N. J. ..... Oct. 2, 1889

UHLIG, CARL. Chf. Draftsman, Board of State Harbor Commrs., Ferry Bldg., San Francisco, Cal. ..... Oct. 7, 1903

UPHAM, CHARLES CLIFTON. 143 Liberty St., New York City ..... April 7, 1897

VALUE, BEVERLY REID. Engr. in Chg., Elec. Development Co. of Ontario, Ltd., Niagara Falls, Ont., Canada ..... Jan. 2, 1901

VAN BUREN, JOHN D. New Brighton, Borough of Richmond, N. Y. ... May 20, 1868

VAN BUREN, ROBERT. 58 West Ave., Norwalk, Conn ..... June 17, 1868

VAN CLEVE, AARON HOWELL. Res. Engr., The Niagara Falls Power Co. and allied companies, Niagara Falls, N. Y.; Res. Engr., Canadian Niagara Power Co., Niagara Falls, Ont.; Address, Niagara Falls, N. Y. .....
Jun. May 31, 1892
Assoc. M. Dec. 5, 1894
M. Nov. 1, 1904

VAN DER HOEK, JACOBUS. Div. Engr., Lehigh Val. R. R., 25 Ripley Pl., Buffalo, N. Y. ..... April 7, 1897

VANDEVANTER, CHARLES OSCAR. Cons. Engr., 238 Park Ave., Baltimore, Md. ..... Sept. 2, 1896

VAN HOESEN, EDMUND FRENCH. Res. Engr., Western Dist., N. Y. C. & H. R. R. R., 145 Washington St., Buffalo, N. Y. ..... July 1, 1891

VAN HORNE, JOHN GARRET. 29 Broadway, New York City ..... Feb. 4, 1880

VAN ORDEN, CHARLES HOPKINS. Catskill, N. Y. ..... June 1, 1898

VAN ORNUM, JOHN LANE. Prof. of Civ. Eng., Washington Univ., St. Louis, Mo. .....
Assoc. M. Oct. 3, 1894
M. Oct. 4, 1899

VAN SANT, ROBERT LAWRENCE. Contr. Engr., Third National Bank Bldg., St. Louis, Mo. ..... Sept. 3, 1884

VAN WINKLE, EDGAR BEACH. 115 East 70th St., New York City ..... Dec. 2, 1868

VAUGHAN, GEORGE WASHINGTON. Div. Engr., Western Div., N. Y. C. & H. R. R. R., 145 Washington St., Buffalo, N. Y. .....
Jun. Mar. 3, 1886
M. Nov. 4, 1896

VAUGHN, GEORGE WASHINGTON. 128 Fifth Ave., Leavenworth, Kans. ... June 3, 1891

VERRILL, GEORGE ELLIOT. Supt., U. S. Engr. Dept., 305 Exchange Bldg., New Haven, Conn ..... Mar. 2, 1904

VIELÉ, MAURICE AUGUSTUS. Civ. and Hydr. Engr., 44 Broad St., New York City .....
Jun. Feb. 4, 1891
Assoc. M. Sept. 7, 1892
M. Oct. 6, 1897

VON GELDERN, OTTO. 89 Flood Bldg., San Francisco, Cal. ..... May 4, 1892

VON LEER, ISAAC WAYNE. Civ., Min., and Hydr. Engr., 813 Crozer Bldg., Philadelphia, Pa. ..... May 3, 1899

VON SCHON, HANS AUGUST EVALD CONRAD. Cons. Engr., 603 Wayne County Savings Bank Bldg., Detroit, Mich. ..... Sept. 2, 1902

VOORHEES, THEODORE. First Vice-Pres., P. & R. Ry. Co., Philadelphia, Pa. ..... May 6, 1885

VORCE, CLARENCE BROWNING. Chf. Engr., John F. Kelly Eng. Co., 149 Broadway, New York City ...
Jun. April 30, 1895
Assoc. M. Oct. 7, 1896
M. May 2, 1900

Date of Membership.

WADDELL, JOHN ALEXANDER LOW. (Waddell & Hedrick, Cons. Engrs.), Kansas City, Mo. — Oct. 5, 1881

WADDELL, MONTGOMERY. Cons. Engr., 1 West 101st St., New York City. — Jun. Sept. 1, 1886; M. Sept. 2, 1896

WADDELL, ROBERT WILLIAM. Contr., 401 Kemper Bldg., Kansas City, Mo. — Sept. 4, 1901

WADSWORTH, HENRY HAYES. U. S. Asst. Engr., Duluth, Minn. (Res., 1809 Hughitt Ave., Superior, Wis.). — Oct. 2, 1901

WAGNER, BERNARD MATTHEW. Asst. Engr., Dept. of Water Supply, 257 Westminster Rd., Flatbush, Brooklyn, N. Y. — Assoc. M. May 3, 1899; M. Dec. 1, 1903

WAGNER, SAMUEL TOBIAS. Asst. Engr., P. & R. Ry., 702 Reading Terminal, Philadelphia, Pa. — Feb. 2, 1887

WAINWRIGHT, JONATHAN. Pres., The Drake & Stratton Co., 32 South Broad St., Philadelphia, Pa. — Feb. 3, 1892

WAIT, JOHN CASSAN. Attorney and Counsellor-at-Law (Eng. and Architectural Jurisprudence), 220 Broadway, New York City. — Feb. 3, 1892

WALDO, MARK ALBIGENSE. Care, Dominion Phosphate Co., Bartow, Fla. — May 2, 1900

WALKER, CLEMENT ISAAC. Chf. Engr., Union Subway Constr. Co., 1170 Broadway, New York City. — Assoc. M. April 1, 1891; M. May 3, 1904

WALKER, ELTON DAVID. Prof. of Hydr. and San. Eng., The Pennsylvania State Coll., State College, Pa. — Jun. Oct. 4, 1892; Assoc. M. June 1, 1898; M. Sept. 5, 1900

WALKER, JAMES WILSON GRIMES. Civ. Engr., U. S. N., Navy Yard, Charleston, S. C. — Oct. 5, 1904

WALKER, JESSE WAGER. (Pittsburgh Constr. Co.), Diamond National Bank Bldg., Pittsburg, Pa. — May 7, 1884

WALKER, JOHN SHAW. Office of Chf. Engr. for Existing Lines, West Australia Govt. Rys., Wellington St., Perth, Western Australia. — Assoc. May 1, 1894; Assoc. M. Mar. 3, 1897; M. Mar. 6, 1901

WALKER, JOHN SIMPSON. U. S. Asst. Engr., Nashville, Tenn. — Jan. 5, 1881

WALLACE, HAROLD ULMER. Chf. Engr., Ill. Cent. R. R., Hotel Windermere, 56th and Cornell Ave., Chicago, Ill. — Dec. 7, 1904

R. WALLACE, JOHN FINDLEY. (*Past-President*). Chf. Engr., Isthmian Canal Comm., Ancon, Canal Zone, Panama, Care, New York Post Office. — June 2, 1886

WALLACE, JOHN HERBERT. Engr., M. of W., S. P. Co. (Merchants Exchange Bldg., San Francisco, Cal. — Jan. 2, 1890

WALLACE, JOSEPH HARRISON. Mill Archt. and Industrial Engr., Temple Court Bldg., New York City. — Jun. Dec. 1, 1896; Assoc. M. Dec. 1, 1897; M. Nov. 6, 1901

WARD, CHARLES DOD. 702 St. Nicholas Ave., New York City. — Mar. 3, 1869

WARMAN, FREDERICK CONOVER. U. S. Asst. Engr., 1000 Twenty-second St., N. W., Washington, D. C. — Assoc. M. Jan. 3, 1900; M. May 3, 1904

WARNER, EDWIN HALL. 1209 Braly Bldg., Los Angeles, Cal. — Assoc. M. May 6, 1891; M. Oct. 4, 1893

		Date of Membership
Warren, William Henry. Challis Prof. of Eng., Univ. of Sydney, Sydney, New South Wales, Australia		Feb. 5, 1890
Washburn, Frank Sherman. Cons. Engr., Nashville, Tenn.		Nov. 7, 1888
Wason, Leonard Chase. Pres. and Engr., Aberthaw Constr. Co., 8 Beacon St., Boston, Mass.	Assoc. M.	April 3, 1901
	M.	April 1, 1903
Waterhouse, John. Cons. Engr., 29 Broadway, New York City		Oct. 4, 1899
Wathen, Benjamin Southern. Chf. Engr., Tex. & Pac. Ry., Dallas, Tex.		Nov. 2, 1892
Watkins, Frederick William. Div. Engr., Aqueduct Comm., New York; Res., 45 Rockledge Ave., White Plains, N. Y.		Oct. 3, 1883
Watkins, Richard. 8 Mears Ave., Randwick, near Sydney, New South Wales, Australia		Dec. 3, 1890
Watson, Wilbur Jay. Bridge Engr., The Osborn Eng. Co., Osborn Bldg., Cleveland, Ohio	Jun.	Oct. 4, 1898
	Assoc. M.	Jan. 2, 1901
	M.	Jan. 3, 1905
Watson, William. Secy., Am. Acad. of Arts and Sciences, 107 Marlborough St., Boston, Mass.	Assoc.	Mar. 1, 1882
	M.	Sept. 2, 1891
Watson, William Parsons. Kansas City, Mo.		June 1, 1887
Watt, David Alexander. U. S. Asst. Engr., Galveston, Tex.		Feb. 6, 1901
Watt, John Marshall Gilkison. U. S. Engr. Office, Chattanooga, Tenn.		Feb. 5, 1902
Webb, George Herbert. Asst. Chf. Engr., M. C. R. R., Michigan Central Station, Detroit, Mich.		Feb. 1, 1893
Webb, Walter Loring. Cons. Engr., 2222 Land Title Bldg., Philadelphia, Pa.	Assoc. M.	May 4, 1892
	M.	May 3, 1904
Weber, Alexander Hamilton. U. S. Asst. Engr., Colorado Bldg., Washington, D. C.		Oct. 3, 1900
Webster, Charles Edward. Chf. Engr., Northern Cons. & Impvt. Co., Binghamton, N. Y.		Oct. 4, 1899
WEBSTER, GEORGE SMEDLEY. (*Director*). Chf. Engr. and Surv., Bureau of Surveys, City Hall, Philadelphia, Pa.	Assoc. M.	Sept. 7, 1892
	M.	Oct. 4, 1893
Webster, William Richardson. Cons. and Insp. Engr., 411 Walnut St., Philadelphia, Pa.		April 5, 1899
Wegmann, Edward. Cons. Engr., White Plains, N. Y.		Mar. 7, 1888
Weinhagen, Fred. Pres., Wisconsin Bridge & Iron Co., 706 Pabst Bldg, Milwaukee, Wis.		July 4 1888
Weiskopf, Samuel C. Cons. Engr., 68 William St., New York City	Jun.	May 7, 1884
	M.	Dec. 5, 1888
Wellman, Samuel Thomas. Pres., Wellman-Seaver-Morgan Co., 1298 Central Ave., Cleveland, Ohio.		Oct. 5, 1898
Wells, Charles Edwin. Const. Engr., U. S. Geological Survey, Reclamation Service, Clinton, Mass		June 1, 1892
Wells, James Hollis. Civ. Engr. and Archt., 32 Nassau St., New York City		Feb. 5, 1901
Wendt, Edwin Frederick. Asst. Engr., Pitts. & Lake Erie R. R. Co., Pittsburg, Pa.		Oct. 7, 1903
Wentworth, Charles Chancellor. Prin. Asst. Engr., Norfolk & West. Ry., Roanoke, Va.		April 4, 1888

Date of Membership.

WEST, CHARLES HUNTER. Chf. Engr., Mississippi Levee Dist., Greenville, Miss. ..... Oct. 1, 1902

WESTINGHOUSE, GEORGE, Jr. Pittsburg, Pa. ..... Jan. 7, 1891

WESTON, CHARLES VALENTINE. Chf. Engr., So. Side Elev. R. R. Co., 450 Thirty-seventh Pl., Chicago, Ill. ..... Sept. 5, 1900

WESTON, EDMUND BROWNELL. Cons. Engr., 86 Weybosset St., Providence, R. I. ..... Dec. 6, 1882

WETHERBEE, GEORGE ALBERT. City Engr., Malden, Mass. ..... April 5, 1893

WETHERILL, WILLIAM CHATTIN. Cons. Engr., Empire Zinc Co., 206 Equitable Bldg., Denver, Colo. ..... Dec. 1, 1886

WHEELER, DANIEL MERRICK. State R. R. Insp., 315 Salisbury St., Worcester, Mass ..... Mar. 6, 1901

WHEELER, EBENEZER SMITH. U. S. Asst. Engr., Detroit, Mich ..... Nov. 7, 1883

WHEELER, EDGAR TRUE. 661 Pacific Electric Bldg., Los Angeles, Cal. Dec. 7, 1904

WHEELER, LEVI LOCKWOOD. Asst. U. S. Engr., Sterling, Ill. ..... June 4, 1884

WHEELER, SCHUYLER SKAATS. Pres., Crocker-Wheeler Co., Ampere, N. J. ..... { Jun. Mar. 2, 1887 / M. Feb. 6, 1889

WHEELER, WILLIAM. Cons. Civ. Engr., 14 Beacon St., Boston, Mass. Oct. 4, 1893

WHINERY, SAMUEL. Cons. Engr., 95 Liberty St., New York City. ..... { Jun. April 1, 1874 / M. May 4, 1881

WHISTLER, JOHN T. Dist. Engr., U. S. Reclamation Service, Pendleton, Ore ..... { Assoc. M. Jan. 2, 1901 / M. Oct. 7, 1903

WHISTLER, THOMAS DELANO. Care, Brown, Shipley & Co., 123 Pall Mall, London, England. ..... { Jun. Mar. 5, 1884 / M. May 2, 1888

WHITCOMB, HENRY DONALD. Richmond, Va. ..... Feb. 21, 1872

WHITE, GEORGE HOWARD. With Worcester Sewer Dept., 20 Shattuck St., Worcester, Mass. ..... May 2, 1883

WHITE, HENRY FISHER. Engr., M. of W., C., R. I. & P. Ry., Chicago, Ill. ..... Jan. 2, 1890

WHITE, JAMES GILBERT. 43 Exchange Pl., New York City ..... Mar. 2, 1904

WHITE, TIMOTHY SIDNEY. V.-P. and Chf. Engr., Penn Bridge Co., Beaver Falls, Pa. ..... April 3, 1889

WHITFIELD, JAMES EDWARD. (Booth, Garrett & Blair, Chemists and Engrs.), 406 Locust St., Philadelphia, Pa. ..... Mar. 2, 1904

WHITFORD, REID. U. S. Asst. Engr., Georgetown, S. C. ..... Dec. 2, 1896

WHITMER, DAVID HEIKES. 152 North Church St., Tucson, Ariz ..... May 6, 1903

WHITNEY, FRANK ORMOND. Chf. of Surveying, Divs. of the Eng. and Street Laying-Out Depts., 25 Old Court House, Boston, Mass. ..... { Jun. May 3, 1876 / M. Jan. 5, 1887

WHITTEMORE, DON JUAN. (*Past-President*). 1345 Railway Exchange, Chicago, Ill. (Res., 222 Biddle St., Milwaukee, Wis.) .. July 10, 1872

WHITTEN, NATHAN HOLLIS. Engr., Holyoke Machine Co., Holyoke, Mass. ..... June 7, 1876

WIEST, JULIUS CHRISTIAN. Chf. Engr. and Contr., Central Div., Nicaragua R. R., Managua, Nicaragua. ..... Feb. 5, 1902

WILCOX, FRANK. Engr. of The T. A. Gillespie Co., 1123 Westinghouse Bldg., Pittsburg, Pa. ..... Oct. 7, 1903

		Date of Membership.
Wiley, Andrew Jackson. Cons. Engr., U. S. Geological Survey, Reclamation Service, Boise, Idaho		Dec. 5, 1894
Wiley, William Halsted. Scientific Publisher, 43 East 19th St., New York City		Feb. 17, 1869
Wilgus, William John. Fifth Vice-Pres., N. Y. C. & H. R. R. R. Co., Grand Central Station, New York City		April 1, 1896
Wilkins, William Glyde. (The W. G. Wilkins Co., Engrs. and Archts.), Westinghouse Bldg., Pittsburg, Pa		Dec. 4, 1889
Willard, James Eager. 27 Kennedy Pl., Louisville, Ky		May 1, 1889
Williams, Charles Page. Engr., U. S. Reclamation Service, Cody, Wyo	Assoc. M. M.	Oct. 2, 1901 Nov. 1, 1904
Williams, Chauncey Grant. Contr., Lynchburg Gravity Water Supply, Lynchburg, Va	Assoc. M. M.	Feb. 6, 1895 Oct. 7, 1903
Williams, Cyrus John Richard. Engr. to the Lyttelton Harbour Board, Christchurch, New Zealand		Feb. 6, 1901
Williams, David. Asst. Engr., B. & M. R. R., St. Johnsbury, Vt.		May 4, 1898
Williams, Edward Gilbert. Res. Engr. and Supt., The New York Continental Jewell Filtration Co., First St. Tunnel, P. R. R., 23 D St., S. E., Washington, D. C		Feb. 3, 1897
N. Williams, Gardner Stewart. Prof. of Civ., Hydr. and San. Eng., Univ. of Mich.; Mem. of International Lake Level Comm.; Cons. Engr., Ann Arbor, Mich.	Assoc. M. M.	Oct. 2, 1895 Dec. 6, 1899
Williamson, Francis Stuart. Cons. Engr., 25 Broad St., New York City		Sept. 7, 1887
Williamson, Sydney Bacon. Engr., Expanded Metal Eng. Co., 256 Broadway, New York City	Assoc. M. M.	Jan. 3, 1894 Dec. 2, 1896
Willis, Paul. Secy. and Engr., Kenwood Bridge Co., 45 Madison Park, Chicago, Ill		Oct. 2, 1901
Wilson, Charles Alfred. Chf. Engr., Cin., Hamilton & Dayton Ry., Cincinnati, Ohio		April 1, 1891
Wilson, Charles Beatty. Roadmaster, N. C. & St. L. Ry., Box 285, Marietta, Ga		Dec. 2, 1903
Wilson, Elliott Hinckley. Civ. and Min. Engr. (Receiver of the Minnie Healey Mine), Butte, Mont		Feb. 1, 1888
Wilson, Everett Broomall. Secy. and Treas. of The Am. Bureau of Inspection and Tests, Monadnock Blk., Chicago (Res., 1408 Dempster St., Evanston), Ill	Assoc. M. M.	Mar. 4, 1903 Dec. 6, 1904
Wilson, George Leverett. Engr. and Roadmaster, Twin City Rap. Trans. Co., Minneapolis, Minn		Feb. 5, 1890
Wilson, Henry William. Archt. and Cons. Engr. (Wilson, Harris & Richards), 1030 Drexel Bldg., Philadelphia, Pa		Sept. 6, 1876
Wilson, Herbert Michael. Geographer, U. S. Geological Survey, Washington, D. C	Jun. M.	Sept. 5, 1883 Jan. 2, 1890
Wilson, Winter Lincoln. Asst. Prof., Civ. Eng., Lehigh Univ., South Bethlehem (Res., 18 S. New St., Bethlehem), Pa		May 1, 1901
Wimmer, Sebastian. St. Mary's, Elk Co., Pa		Mar. 2, 1881
Wingfield, Nisbet. Cons. Engr., Augusta, Ga		May 1, 1895

Date of Membership.

WISE, COLIN REED. City Surv. and Supt., Sewers, 34 Bloomfield Ave., Passaic, N. J. — April 6, 1904

WISNER, GEORGE MONROE. Asst. Chf. Engr., San. Dist. of Chicago, 1010 Security Bldg., Chicago, Ill. — Feb. 4, 1903

WISNER, GEORGE Y. Civ. and Cons. Engr.; Cons. Engr., U. S. Reclamation Service, 39 West Canfield Ave., Detroit, Mich. — April 5, 1876

WITMER, JOSEPH FRANKLIN. Hydr. and San. Engr., Room 1, Chapin Blk., Buffalo, N. Y. — May 4, 1904

WOERMANN, JOHN WILLIAM. U. S. Asst. Engr., 14 ft. Waterway, Chicago to Mississippi River, 1115 N. Monroe St., Peoria, Ill. — Assoc. M. May 1, 1895; M. May 7, 1902

WOLF, JULIUS HERMAN GEORGE. Engr. Office, U. S. A., Care, Maj. Harry Taylor, Manila, Philippine Islands — Assoc. M. May 7, 1902; M. April 5, 1904

WÖLFEL, PAUL LUDWIG. Chf. Engr., Am. Bridge Co., Ambridge, Pa. — Jun. July 3, 1889; Assoc. M. July 1, 1891; M. Nov. 6, 1895

WOLVERTON, IRVING MASON. Chf. Engr., The Mt. Vernon Bridge Co., Mt. Vernon, Ohio — Assoc. M. Dec. 4, 1895; M. Dec. 1, 1903

WOOD, HENRY BEECHER. Asst. Engr., Harbor and Land Comm., Room 134, State House, Boston, Mass. — April 3, 1895

WOOD, JOSEPH. Second Vice-Pres., Penn. Lines W. of Pitts., Pittsburg, Pa. — April 1, 1874

WOODARD, SILAS H. Res. Engr., East River Div., Penn., N. Y. & L. I. R. R; Address, Scarsdale, N. Y. — Assoc. M. Jan. 2, 1901; M. Nov. 1, 1904

WOODBURY, CHARLES JEPTHA HILL. Asst. Engr., Am. Telephone & Telegraph Co., 125 Milk St., Boston, Mass. — Dec. 3, 1884

WOODRUFF, EDWARD LOWREY. Asst. Engr., Ninth Light-House Dist., Milwaukee, Wis. — Oct. 3, 1900

WOODS, HENRY DICKINSON. 99 Highland St., West Newton, Mass. — Assoc. M. Mar. 1, 1893; M. June 5, 1895

C. WOODS, ROBERT PATTERSON. Cons. Engr., 801 Traction Bldg., Indianapolis, Ind. — Jun. Feb. 2, 1897; Assoc. M. Mar. 7, 1900; M. April 1, 1903

WOOLLEY, ANDREW FEASTER. 327 Prudential Bldg., Atlanta, Ga. — Dec. 2, 1903

WORCESTER, JOSEPH RUGGLES. Cons. Engr., 53 State St., Boston, Mass. — Jan. 2, 1895

WORTHINGTON, CHARLES. Cons. Engr., Farmers Bank Bldg., Pittsburg, Pa. — Assoc. M. Dec. 1, 1897; M. Nov. 6, 1901

WRIGHT, AUGUSTINE WASHINGTON. Cons. Engr., Pomona, Cal. — May 5, 1886

WRIGHT, CHARLES HERBERT. Chf. Engr., Brown Hoisting Machinery Co., Cleveland, Ohio — Oct. 5, 1892

WRIGHT, EDWARD THOMAS. Room 690, Pacific Electric Bldg., Los Angeles, Cal. — Feb. 3, 1886

WRIGHT, JOSEPH BODINE. Cons. Engr., Steel and Concrete Steel, 2528 Broadway, New York City — Assoc. M. June 2, 1897; M. Jan. 31, 1905

WRIGHT, WILLIS BENTON. Div. Engr., Sewerage and Water Board, 20 City Hall, New Orleans, La. — Nov. 3, 1897

WROTNOWSKI, ARTHUR FRANCIS. Hermosillo, Sonora, Mexico — July 12, 1877

Date of Membership.

YAMAGUCHI, JUNNOSUKE. Chf. Engr., Sanyo Ry. Co., Kobe, Japan.... Mar. 4, 1903

YATES, PRESTON KING. First Asst. Engr., L. S. & M. S. R. R., 67 Spangler Ave., Cleveland, Ohio..... Jun. June 6, 1883; M. April 5, 1893

YEATMAN, CHARLES POPE. Mgr., Barranquilla Ry. & Pier Co., Barranquilla, Colombia..... Feb. 2, 1887

YEATMAN, MORGAN EDWARD. Care, S. Pearson & Son, Ltd., 10 Victoria St., London, S. W., England..... May 4, 1892

YEATMAN, POPE. Care, A. W. Sewall, 1206 Spruce St., Philadelphia, Pa. Oct. 4, 1893

YONGE, SAMUEL HUMPHREYS. U. S. Asst. Engr. in Chg. of Impvt., James River, Va., and Protection of Jamestown Island, 28 North 9th St., Richmond, Va..... May 5, 1880

C. YORK, HERBERT WALDO. Chf. Engr., Am. Smelting & Refining Co., 71 Broadway, New York City..... Jun. May 2, 1888; M. Jun. 3, 1896

YOUNG, JOHN. Geneseo, N. Y..... Mar. 7, 1888

YOUNG, ROSCOE CYPRIAN. Chf. Engr., Lake Superior & Ishpeming Ry., Marquette, Mich..... Oct. 1, 1902

ZIESING, AUGUST. Western Mgr., Am. Bridge Co., 1315 Monadnock Blk., Chicago, Ill..... Oct. 5, 1898

ZIFFER, EMANUEL A. Pres. of the Council of Adm. of the Imp. Royal Privileged Lemberg-Czernowitz and Jassy Ry. Co., I Opernring 5, Vienna, Austria..... June 7, 1893

ZINN, GEORGE ARTHUR. Maj., Corps of Engrs., U. S. A., 1050 Main St., Wheeling, W. Va..... Feb. 3, 1904

ZOLLINGER, LUTHER REESE. Prin. Asst. Engr., P. R. R. Div., P. R. R. Co., Altoona, Pa..... Mar. 6, 1901

ZOOK, MORRIS ALEXANDER. Plainfield, N. J..... Oct. 4, 1899

Members, 1819.

ASSOCIATE MEMBERS.

[Assoc. M. Am. Soc. C. E.]

Date of Membership.

ABELLA, JUAN. Cons. Engr., Buenos Aires & Belgrano Elec. Tramways Co., 1882 Calle Virreyes (Belgrano), Buenos Aires, Argentine Republic ..... Jan. 6, 1897

ADAMS, ARTHUR. Asst. Engr., Barge Canal, N. Y. S., Mann Bldg., Utica, N. Y. ..... Jun. Oct. 1, 1901; Assoc. M. April 6, 1904

ADAMS, JULIUS LE ROY. Chf. Engr., Hartford, Manchester & Rockville Tramway Co., South Manchester, Conn ..... Jun. Jan. 4, 1888; Assoc. M. April 5, 1899

ADEY, WILLIAM HENRY. Asst. Engr., D. & H. Co., Albany (Res., 181 Main St., Cohoes), N. Y. ..... Jun. Feb. 4, 1896; Assoc. M. Dec. 3, 1902

ADGATE, FREDERICK WHITNEY. Supt. for The Foundation Co., Terre Haute, Ind ..... Jan. 6, 1904

AFFELDER, LOUIS JACOB. Contr. Mgr., Am. Bridge Co. of N. Y., Frick Bldg., Pittsburg, Pa. ..... Jun. Feb. 4, 1896; Assoc. M. June 5, 1901

ALBREE, RALPH. 1112 Western Ave., Allegheny, Pa ..... Jun. Oct. 4, 1898; Assoc. M. Oct. 1, 1902

ALDEN, HERBERT CLARENDON. Asst. Engr., Aqueduct Comm., Jerome Park Reservoir, Kingsbridge, New York City ..... Mar. 1, 1893

ALLAN, ALEXANDER GEORGE. Asst. Engr., Grand Trunk Pacific Ry., P. O. Box 68, Winnipeg, Man., Canada ..... Mar. 6, 1901

ALLEN, CHARLES METCALF. Asst. Prof. of Experimental Eng., Worcester Poly. Inst., Worcester, Mass. ..... June 1, 1904

ALLEN, FRANK WILLIAM. 5 West 125th St., New York City ..... Jun. Nov. 3, 1896; Assoc. M. May 4, 1898

ALLEN, WALTER HINDS. Civ. Engr., U. S. N., U. S. Navy Yard, Brooklyn, N. Y. ..... Jun. May 1, 1900; Assoc. M. Nov. 4, 1903

ALLEN, WILLIAM FREDERICK. Secy., Am. Ry. Assoc., 24 Park Pl., New York City ..... Jan. 3, 1900

AMES, GEORGE MARSHALL. 121 Ottawa St., Grand Rapids, Mich. ..... June 7, 1899

ANDERSON, DAVID GUY. U. S. Asst. Engr., Engr. Office, U. S. A., Mobile, Ala ..... Oct. 4, 1899

ANDROS, FREDERIC WILLIAM. Div. Engr., Mex. International R. R., Durango, Mexico ..... Feb. 1, 1899

ARANGO, RICARDO MANUEL. Cons. Engr. for the Panama Water-Works and Sewerage System, Isthmian Canal Comm., Panama, Panama. Sept. 2, 1896

ARCHER, STEVENSON, Jr. Greenville, Miss. ..... Nov. 3, 1897

Date of Membership.

ARMITAGE, GEORGE WASHINGTON. Civ. Engr. and Supt. of Constr., Q. M. Dept., U. S. A., Dodge, Walker Co., Ga. ..... April 2, 1902

ARMOUR, CHARLES WEBSTER L. 619 Garrison Ave., Fort Smith, Ark. .. June 1, 1904

ASH, DORSEY. Supt. of Constr. of Public Bldgs., U. S. Court House and Post Office, Salt Lake City, Utah ..... June 3, 1903

ASHBAUGH, LEWIS EUGENE. Asst. Prof. of Civ. Eng., Iowa State Coll., Ames, Iowa ..... Jan. 7, 1903

ASHBRIDGE, RICHARD I. DOWNING. East Downingtown, Pa. ..... Sept. 3, 1902

ATKINS, HAROLD BEDFORD. Cons. Engr., 80 Broad St., New York City ..... April 2, 1902

AURYANSEN, FREDERICK. Asst. Bridge Engr., Atlantic Ave. and Bay Ridge Impvts., L. I. R. R., 5 Hanson Pl., Brooklyn, N. Y. ..... Jun. Oct. 5, 1897; Assoc. M. Dec. 3, 1902

AYLETT, PHILIP. Bridge Engr., Seaboard Air Line Ry., Portsmouth, Va. June 3, 1896

AYRES, CLARENCE MORTON. Chf. Engr., Central Iron & Coal Co., Holt, Ala ..... Oct. 2, 1901

BABCOCK, WILLIAM STUART. 17 Battery Pl., New York City ..... Feb. 1, 1905

BACON, GEORGE MORGAN. 624 Dooly Blk., Salt Lake City, Utah ..... Dec. 3, 1902

BAILEY, WILLIAM MELVIN. Engr. for Eastern Expanded Metal Co., 602 Paddock Bldg., Boston, Mass. ..... Sept. 5, 1900

BAIRD, SAMUEL POND. Gen. Mgr., The Portsmouth St. R. R. & Light Co., Portsmouth, Ohio ..... Mar. 1, 1899

BAKER, ELISHA BROWN. Contr., 1204 Farmers Bank Bldg., Pittsburg, Pa. ..... April 1, 1896

BAKER, HENRY ERSKINE. City Engr. and Engr. of Water Board, Watertown, N. Y. ..... May 7, 1902

BAKER, HUGH COSSART, Jr. Engr., Subway Constr., New York Tel. Co., 30 Gold St., New York City ..... May 4, 1904

BAKER, SHIRLEY. Mgr., Excelsior Wooden Pipe Co., 204 Front St., San Francisco, Cal. ..... Jun. Sept. 11, 1900; Assoc. M. June 3, 1903

BALCH, WILLIAM HOYT. Engr., Aberthaw Constr. Co., 8 Beacon St., Boston, Mass ..... April 1, 1903

BALDWIN, ERNEST HOWARD. Div. Engr., Met. Water-Works, Oakdale, Mass. ..... May 4, 1898

BALDWIN, HIRAM ELLSWORTH. 32 Earle Ave., Glenville, Ohio ..... Jan. 2, 1895

BAMFORD, WILLIAM BROKAW. Archt. and Structural Engr., 1123 Broadway, New York City ..... Jun. June 2, 1903; Assoc. M. Oct. 5, 1904

BANCE, CHARLES WILLIAM. Asst. Engr., Jersey City Water Supply Co., 156 Ellison St., Paterson, N. J. ..... Mar. 5, 1902

BANDY, JAMES MARCUS. City Engr., Greensboro, N. C. ..... Feb. 4, 1903

BANKS, JOHN EDWIN. Dept. Engr. with Am. Bridge Co., Pittsburg, Pa. ..... June 4, 1902

BANTEL, EDWARD CHRISTIAN HENRY. Instr. in Civ. Eng., Univ. of Texas, 2608 Rio Grande St., Austin, Tex. ..... Feb. 4, 1903

BARNES, FRED ASA. Instr. in Civ. Eng., Cornell Univ., 324 Huestis St., Ithaca, N. Y. ..... Dec. 7, 1904

Date of Membership.

BARNES, WILLIAM THOMAS. Asst. to Leonard Metcalf, 14 Beacon St., Boston, Mass. (Res., 61 Elm St., Waterville, Me.)..... Sept. 7, 1898

BARNETT, ROBERT CRARY. 3023 East 20th St., Kansas City, Mo..... Dec. 5, 1900

BARNEY, PERCY CANFIELD. Dept. of Yards and Docks, Navy Yard, Brooklyn, N. Y.....
Jun. Mar. 3, 1896
Assoc. M. June 5, 1901

BARNSLEY, GEORGE THOMAS. Res. Engr. in chg. of Constr., Wabash-Pittsburg Terminals, Wabash Bldg., Pittsburg (Res., Oakmont), Pa.....
Jun. May 31, 1892
Assoc. M. Mar. 7, 1894

BARR, JOSEPH CARROLL. Engr. for Real Estate Trust Co., 311 Fourth Ave., Pittsburg, Pa..... Jan. 4, 1899

BARROWS, HAROLD KILBRETH. Engr., U. S. Geological Survey, Dist. Hydrographer for New England, 6 Beacon St., Boston, Mass... Jan. 6, 1904

BARTOCCINI, ASTOLFO. Pres., Italian Am. Eng. Co., 630 West 148th St., New York City..... May 6, 1903

BARTRAM, GEORGE CORRIE. Res. Engr., Phœnix Bridge Co., 110 State St., Boston, Mass.....
Jun. Jan. 31, 1899
Assoc. M. Sept. 2, 1902

BASCOM, HARRY FRANKLIN. (Lehr & Bascom), 7 South Seventh St., Allentown, Pa.....
Jun. Dec. 5, 1899
Assoc. M. Sept. 4, 1901

BASCOME, WESTERN RADFORD. 728 Century Bldg., St. Louis, Mo.....
Jun. Dec. 3, 1891
Assoc. M. May 5, 1897

BASINGER, JAMES GARNETT. Asst. Engr., Dept. Docks and Ferries, 602 West 22d St. (Res., 119 West 117th St.), New York City.... Oct. 3, 1900

BASSETT, ROBERT JAY. 287 Clinton St., Brooklyn, N. Y....
Jun. Feb. 3, 1903
Assoc. M. Feb. 3, 1904

BAUER, JACOB LOUIS. 25 Dix Bldg., Elizabeth, N. J..... Feb. 5, 1896

BAUM, GEORGE. Master Mechanic, Niagara Falls Constr. Co., Hotel La Fayette, Niagara Falls, Ont., Canada.....
Jun. Jan. 4, 1892
Assoc. M. Apr. 5, 1899

BAUSHER, CARMI IRVING. Asst. Engr., B. & C. Dept., The Penna. Steel Co., Steelton, Pa., 136 North 13th St., Harrisburg, Pa..... Dec. 7, 1898

BAYLISS, JOHN YANCEY. 5275 McPherson Ave., St. Louis, Mo..... Sept. 2, 1903

BEACH, JAMES GEORGE. Apalachin, Tioga Co., N. Y.....
Jun. Aug. 31, 1897
Assoc. M. Sept. 2, 1903

BEERBOWER, GEORGE MARSHALL. Engr., N. Y. Zoological Park, 183d St. and Southern Boulevard, New York City..... Oct. 7, 1903

BELKNAP, FRANCIS WHEELWRIGHT. Engr., Phœnix Constr. & Supply Co., 517 East 80th St., New York City..... Feb. 1, 1905

BELKNAP, JOHN MANSFIELD. Prin. Asst. Engr., West Indies Constr. Co., San Juan, Porto Rico..... May 4, 1904

BELL, ALFRED CARROLL. Contr. Engr., Wisconsin Bridge & Iron Co., 706 Pabst Bldg., Milwaukee, Wis.....
Jun. May 2, 1893
Assoc. M. Jan. 2, 1901

BELLOWS, OSCAR FRANCIS. Supt. of Constr., Q. M. Dept., U. S. A., Fort Ontario, N. Y.; Address, 159 East Third St., Oswego, N. Y. Dec. 4, 1901

BENTZON, ADRIAN BENONI. Div. Engr., Cerro de Pasco Ry., Cerro de Pasco, Peru..... Mar. 6, 1901

BERGER, BERNT. Asst. to Theodore Cooper, 45 Broadway, New York City..... April 5, 1893

Date of Membership.

BEST, JOHN HENRY. U. S. Junior Engr., 1515 N. Monroe St., Peoria, Ill. ..... June 1, 1904

BETTES, CHARLES ROBERT. Chf. Engr., Queens Co. Water Co., Far Rockaway, N. Y. .... Jun. Oct. 1, 1890; Assoc. M. June 7, 1893

BETTS, EDWARD EVERETT. Engr. in Chg., Chickamauga and Chattanooga National Military Park, Chattanooga, Tenn. ..... April 5, 1899

BETTS, ROMEO THOMPSON. Asst. Engr., Dept. Docks and Ferries, Foot of East 24th St., New York City ..... Oct. 3, 1900

BISHOP, WILLIAM ISRAEL. Supt., T. A. Gillespie Co., New London, Stanley Co., N. C. ..... Feb. 6, 1901

BLANCHARD, MURRAY. Junior Engr., U. S. Lake Survey, 33 Campau Bldg., Detroit, Mich. ..... April 2, 1902

BLAND, MILES CARLISLE. Contr. Mgr., Am. Bridge Co. of New York, Chamber of Commerce Bldg., Cleveland, Ohio. ..... Sept. 3, 1902

BLISS, GEORGE HENRY. Asst. Engr., U. S. Reclamation Service, 10 Allen St., Newburyport, Mass ..... Sept. 7, 1904

BLODGETT, JOHN. With Am. Bridge Co., Ambridge, Pa.. Jun. Dec. 4, 1889; Assoc. M. Jan. 2, 1901

BOARDMAN, HAROLD SHERBURNE. Prof. of Civ. Eng., Univ. of Maine, Orono, Me ..... Feb. 3, 1904

BOARDMAN, HOWARD EDWARD. Chf. of Party, North River Div., P., N. Y. & L. I. R. R., 558 West 33d St., New York City ..... Jun. Oct. 7, 1902; Assoc. M. Jan. 4, 1905

BOATRITE, JAMES EDWIN. Chf. Engr., Guerber Eng. Co., Bethlehem (Res., 835 Broadway, South Bethlehem), Pa. ..... Jun. Feb. 5, 1895; Assoc. M. Nov. 3, 1897

BOECKLIN, WERNER. Asst. Engr., John A. Mend & Co., 11 Broadway, New York City ..... Jun. Mar. 1, 1892; Assoc. M. Dec. 1, 1897

BOGEN, LOUIS EDWARD. In Chg. of Estimating Eng. of The Bullock Elec. Mfg. Co. (Res., 1855 Hewitt Ave.), Cincinnati, Ohio ..... Jun. April 30, 1895; Assoc. M. June 4, 1902

BOLLER, ALFRED PANCOAST, Jr. The Westinghouse Machine Co., 10 Bridge St., New York City ..... Jun. Oct. 2, 1894; Assoc. M. May 3, 1899

BONNETT, CHARLES PIERRE. 421 Westminster Ave., Elizabeth, N. J. ..... Jun. June 2, 1886; Assoc. M. Mar. 6, 1901

BOOTH, GEORGE WILLIAM. Corps of Engrs., National Board of Fire Underwriters, New York City; Address, Northboro, Mass ..... Sept. 7, 1904

BORIGHT, WILLIAM PARSONS. With Pepper & Register, Engrs. and Contrs., 112 North Broad St., Philadelphia, Pa. ..... Jun. Jan. 2, 1894; Assoc. M. Mar. 1, 1899

BOURNE, THOMAS JOHNSTONE. (S. Pearson & Sons, Ltd.), Tientsin, China ..... Feb. 7, 1900

BOWEN, EDMUND IGNATIUS. Train Master, Erie R. R., Hornellsville, N. Y. ..... Nov. 1, 1899

BOWEN, SHERMAN WORCESTER. Structural Engr., 5945 Cote Brilliante Ave., St. Louis, Mo. ..... Sept. 7, 1904

BOWLER, FRANK COLBURN. Millinocket, Me. ..... Oct. 5, 1904

Date of Membership.

BOWMAN, JOSEPH HOCKMAN. Chf. Engr., Pan-American R. R., Tonalá, Chiapas, Mexico ..... Dec. 2, 1903

BOWNE, WILLIAM HUNT. Glen Cove, N. Y. ..... Dec. 7, 1904

BOYD, JAMES CHURCHILL. Asst. Engr., with Westinghouse, Church, Kerr & Co., 10 Bridge St., New York City. ..... Jun. Sept. 3, 1895; Assoc. M. May 1, 1901

BRADSHAW, SAM WIGFALL. Asst. Engr., Estimating Dept., Bridge & Constr. Dept., Pennsylvania Steel Co., Steelton, Pa. ..... Jun. Oct. 2, 1900; Assoc. M. Feb. 4, 1903

BRANCH, THOMAS PETTUS. Prof., Civ. Eng., Georgia School of Technology, Atlanta, Ga. ..... Feb. 5, 1902

BRANNE, JOHN SEVERIN. Structural Engr.; Secy., James E. Brooks Co., Cons. Engrs., 45 Broadway, New York City (Res., 145 Chester St., Mt. Vernon, N. Y.). ..... Oct. 5, 1898

BRAUNE, GUSTAVE MAURICE. Care, The State Engr., Albany, N. Y. ..... Jun. June 2 1896; Assoc. M. Sept. 4, 1901

BRAXTON, JAQUELIN MARSHALL. U. S. Asst. Engr., Key West, Fla. ..... Jun. Jan. 5, 1897; Assoc. M. May 3, 1899

BREED, CHARLES BLANEY. Instr. in Civ. Eng., Mass. Inst. Tech., Boston, Mass. ..... May 6, 1903

BRENN, CHARLES FERDINAND. Red Lodge, Mont. ..... May 4, 1904

BRENNEKE, WILLIAM GEORGE. (Brenneke & Fay, Cons. Civ. Engrs.), 1009 Fullerton Bldg., St. Louis, Mo. ..... Mar. 5, 1902

BRERETON, THOMAS JOHN. Engr., Cumberland Val. R. R., Chambersburg, Pa. ..... Jun. Oct. 7, 1885; Assoc. M. June 5, 1895

BRIGHT, CHARLES EDWIN. Res. Engr., K., L. F. & J. R. R., Dossetts, Tenn. ..... Dec. 3, 1902

BRINSMADE, DANIEL EDWARDS. Box 545, Derby, Conn. ..... April 6, 1904

BROOK-FOX, EVELYN. Res. Engr., East Indian Ry., Bankipore, Bengal, India. ..... Feb. 2, 1898

BROOKS, JOHN PASCAL. Prof. of Civ. Eng., Coll. of Kentucky, 231 North Broadway, Lexington, Ky. ..... April 1, 1896

BROWER, EDWARD SYLVESTER. Borough President's Office (Res., 865 Park Pl.), Brooklyn, N. Y. ..... Dec. 2, 1903

BROWN, MAURICE FRITCHLEY. Chf. Engr., Boston Bridge Works, 47 Winter St., Boston, Mass. ..... Mar. 4, 1903

BROWN, ROBERT KING. Engr., M. of W., S. P., L. A. & S. L. R. R. Co., Salt Lake City, Utah. ..... June 7, 1893

BROWN, STEPHEN PEARSON. Cons. Engr., Stratford, Conn. ..... Oct. 5, 1904

BROWNE, JAMES SIMPSON. Div. Engr., N. Y., N. H. & H. R. R., 309 Union Station, Providence, R. I. ..... Oct. 4, 1893

BROWNING, GEORGE ELLIOT. Chf. Engr., Cochin Govt., Rose Bank, Trichur, South India. ..... May 7, 1902

BRYDONE-JACK, ERNEST EDMUND. Dean of the Eng. Faculty, Univ. of New Brunswick, and City Engr., Fredericton, N. B., Canada. ..... Oct. 4, 1899

BRYNN, PER. Care, Am. Bridge Co., Ambridge, Pa. ..... Feb. 4, 1903

BRYSON, THOMAS BINES. Care, O'Rourke Eng. Constr. Co., 1 West 34th St., New York City. ..... Feb. 7, 1900

		Date of Membership.
Buffinton, Benjamin Thomas. Fall River, Mass		Sept. 7, 1904
Bugbee, Newton Albert Kendall. 207 Academy St., Trenton, N. J.		Oct. 5, 1904
Burchard, Anson Wood. 21 Front St., Schenectady, N. Y		May 3, 1893
Burden, Morton. Care, Eng. Dept., Am. Bridge Co., Frick Bldg., Pittsburg, Pa	Jun.	Feb. 4, 1896
	Assoc. M.	Jan. 2, 1901
Burgess, George Heckman. Asst. Engr., Pennsylvania Lines, 1116 Union Station, Pittsburg, Pa	Jun.	Feb. 1, 1898
	Assoc. M.	June 3, 1903
Burns, James Ferguson. Roadmaster, L. & N. R. R., Lebanon, Ky	Jun.	Oct. 1, 1895
	Assoc. M.	Sept. 6, 1899
Burns, Justin. Res. Engr., Rapid Transit Subway Constr. Co., 1913 Amsterdam Ave., New York City		April 6, 1898
Burrowes, Harry Gilbert. Asst. Engr., Hudson Impvt. Co., Foot of Fifteenth St., Jersey City, N. J	Jun.	Sept. 2, 1902
	Assoc. M.	Feb. 3, 1904
Bush, Edward Wallace. Asst. Engr., Conn. River Bridge and Highway Dist. Comm., Ætna Life Bldg., Hartford, Conn		April 5, 1899
Butcher, William Laramy. Asst. Engr., Mass. State Board of Health, 140 State House, Boston, Mass		May 4, 1904
Buzzell, Josiah William. Gen. Mgr. for Frank B. Gilbreth, Gen. Contr., 176 Federal St., Boston, Mass		April 6, 1904
Cameron, John Bobbs. Div. Engr., B. & O. R. R., New Castle, Pa	Jun.	Oct. 2, 1900
	Assoc. M.	Feb. 3, 1904
Campbell, Albert Johnstone. Broad St. Ave., London, E. C., England.		May 2, 1894
Campbell, Arthur Ira. Lawson, Mo		Dec. 2, 1903
Carlile, Thomas Jenks. Asst. Engr., West Indies Constr. Co., P. O. Box 794, San Juan, Porto Rico	Jun.	Mar. 3, 1896
	Assoc. M.	Mar. 6, 1901
Carney, Edward Joseph. Dept. of Bridges, 19 Park Row (Res., 305 West 104th St.), New York City	Jun.	Feb. 1, 1898
	Assoc. M.	April 1, 1903
Carpenter, Allan Wadsworth. Engr. of Bridges, Main Line and Branches, N. Y. C. & H. R. R. R., 504 Grand Central Station, New York City	Jun.	Mar. 5, 1901
	Assoc. M.	April 1, 1903
Carroll, Charles Joseph. Div. Engr., Mex. International R. R., Durango, Mexico		Oct. 5, 1904
Carter, Alfred Ellsworth. Asst. Engr., Rapid Transit Subway Constr. Co., 453 West 123d St., New York City		June 4, 1902
Carter, Richard William. Bridge Engr., Key West Extension of Florida East Coast Ry., Miami, Fla		Oct. 1, 1902
Carter, Shirley. U. S. Engr. Office, Room 16, Custom House, Norfolk, Va	Jun.	May 31, 1892
	Assoc. M.	Oct. 5, 1898
Chambers, Herbert James. Contr. Engr. for Milliken Bros., 11 Broadway, New York City		Nov. 5, 1902
Chapleau, Samuel Jefferson. Dist. Engr., Georgian Bay Ship Canal, Dept. of Public Works, P. O. Box 347, Ottawa, Ont., Canada		May 1, 1901
Charlsworth, William Saxon. Dannevirke, Napier, New Zealand		Nov. 1, 1899
Chase, Richard Davenport. With Allen Hazen, Cons. Engr., 220 Broadway, New York City	Jun.	Oct. 5, 1897
	Assoc. M.	Oct. 3, 1900

Date of Membership.

CHESTER, CHARLIE ELLSWORTH. Mgr., Water-Works and Co. Surv., Shelbyville, Ill. ..... May 4, 1898

CHRISTIAN, GEORGE LYON. Asst. Engr., Bureau of Sewers, Borough of the Bronx, East 177th St. and 3d Ave. (Res., East 238th St., Woodlawn), New York City. ..... Mar. 6, 1895

CHURCHILL, PERCIVAL MITCHELL. Engr., U. S. Reclamation Service, Chamber of Commerce Bldg., Denver, Colo. ..... June 1, 1904

CLAPP, GEORGE HUBBARD. Chairman, Pittsburgh Testing Laboratory, Ltd., 325 Water St., Pittsburg, Pa. ..... July 1, 1891

CLARK, EDWARD COTMAN. (Swinburne & Clark), 156 Fifth Ave., New York City. ..... Feb. 3, 1904

CLARK, EDWIN. Structural Engr. and Bldg. Insp., Room 317, City Hall, Bureau of Bldg. Inspection, Philadelphia, Pa. ..... Jan. 6, 1897

CLARK, GEORGE HALLETT. Senior Asst. Engr., First Div., Rapid Transit R. R. Comm., 406 West End Ave., New York City. ..... { Jun. Oct. 3, 1893; Assoc. M. April 6, 1898

CLARK, ROSCOE NATHANIEL. 800 Main St., Hartford, Conn. ..... May 4, 1904

CLERMONT, JOHN BAPTISTE. Supt. of Constr., V. J. Hedden & Sons Co., New Met. Life Insurance Bldg., New York City. ..... May 4, 1904

COATES, FRANK RAYMOND. 318 Grand Central Station, Chicago, Ill. ..... Jan. 3, 1900

COKEFAIR, FRANCIS ALBERTSON. Chf. Engr., Great Northern Power Co., 316 Providence Bldg., Duluth, Minn. ..... April 6, 1904

COLE, BURT. Supt., Tecumseh Iron Co., Tecumseh, Ala. ..... Jan. 2, 1901

COLE, EDWARD SMITH. Hydr. Engr., 220 Broadway, New York City. ..... Sept. 7, 1904

COLE, HARRY OUTEN. Office of V. G. Bogue, Cons. Engr., 15 William St., New York City (Res., 547 Carlton Ave., Brooklyn, N. Y.). ..... Jan. 4, 1905

COLE, HERBERT NICHOLS. Asst. Engr., Semet-Solvay Co., Milwaukee, Wis. ..... Jan. 6, 1904

COLEMAN, HENRY FITCH. Treas., Indiana Northern Traction Co., 931 Real Estate Trust Bldg., Philadelphia, Pa. ..... Mar. 6, 1895

COLLIER. BRYAN CHEVES. Asst. Engr., Bureau of Highways (Res., 2721 Bainbridge Ave.), Bronx, New York City. ..... Oct. 3, 1900

COLLINS, CHARLES EDWIN. Cons. Civ. Engr., Drexel Bldg., Philadelphia, Pa ..... Mar. 2, 1904

COLLINS, CLARKE PELEG. Civ. and Min. Engr., 305 Suppes Bldg., Johnstown, Pa. ..... June 4, 1902

COMSTOCK, CHARLES WORTHINGTON. Civ. and Min. Engr., 213 Boston Bldg., Denver, Colo. ..... { Jun. April 5, 1892; Assoc. M. Feb. 7, 1900

CONGER, ALGER ADAMS. Computer in Chg., Lock Dept., N. Y. State Barge Canal, De Graaf Bldg., Albany, N. Y. ..... Oct. 1, 1902

CONKLING, LEON DE VERE. Draftsman, Office of Second Asst. Engr., L. S. & M. S. Ry., Cleveland, Ohio. ..... Dec. 4, 1901

CONNICK, HARRIS DEHAVEN. Asst. Engr., Dept. of Public Works, City Hall, San Francisco, Cal. ..... { Jun. Jan. 3, 1899; Assoc. M. Feb. 4, 1903

CONNOR, WILLIAM DURWARD. Capt., Corps of Engrs., U. S. A., Staff Coll., Fort Leavenworth, Kans. ..... Jan. 7, 1903

Date of Membership.

CONROW, HERMAN. Contr. Engr., Moorestown, N. J..... { Jun. May 3, 1898 / Assoc. M. Jan. 4, 1905

CONSTANT, FRANK HENRY. Prof. of Structural Eng., Univ. of Minnesota, Minneapolis, Minn..... Dec. 2, 1896

CONVERSE, WILLIAM HASSON. Pres., Converse Bridge Co., Chattanooga, Tenn..... Jan. 6, 1892

COOK, JOHN HENRY. Hydr. Engr., Society for Establishing Useful Manufactures, Paterson, N. J..... May 4, 1898

COOMBS, ROBERT DUNCAN, Jr. 4 Water St., Houlton, Me.. { Jun. May 2, 1899 / Assoc. M. Feb. 7, 1900

CORBY, CHARLES EDWARD. In Chg. of Drafting Room, Met. St. Ry. Co., 822 Putnam Ave., Brooklyn, N. Y ..... Oct. 4, 1893

CORNELL, DOUGLAS. Structural Engr., Bureau of Bldg., 1 Municipal Bldg., Buffalo, N. Y..... Sept. 6, 1899

CORNER, CHARLES. Res. Engr., Rhodesia Rys., Bulawayo, Rhodesia, South Africa ..... May 1, 1895

CORNING, DUDLEY TIBBITS. M. E. and S. Dept., Cambria Steel Co., Johnstown, Pa..... Oct. 1, 1902

CORRIGAN, GEORGE WASHINGTON. Asst. Engr., Mo. Pac. Ry., 3756 Cook Ave., St. Louis, Mo..... { Jun. Feb. 5, 1901 / Assoc. M. Oct. 5, 1904

CORTI, JOSEPH JAMES. Casilla Correa 68, Mendoza, Argentine Republic..... Jan. 1, 1896

CORY, HARRY THOMAS. Asst. in Gen. Mgr.'s Office, S. P. Co., San Francisco, Cal..... { Jun. June 20, 1893 / Assoc. M. Mar. 7, 1900

COSMUS, JOHN ALBERT. Special Agt., Continental Fire Ins. Co., Box 187, Utica, N. Y..... June 3, 1896

COVERDALE, WILLIAM HUGH. Cons. Engr., 66 Broadway, New York City..... { Jun. Jan. 2, 1894 / Assoc. M. Oct. 3, 1900

COWPER, JOHN WHITFIELD. James Stewart & Co., Contrs., 135 Broadway, New York City ..... { Jun. June 21, 1894 / Assoc. M. Oct. 2, 1901

CRAIG, PHILIP INSLEY. Chf. Engr., Phil. & Easton Ry. Co., Easton, Pa..... Feb. 3, 1904

CRAIG, WASHINGTON RIGHTER. Asst. Engr., Buffalo & Susquehanna Ry. Co., Boston, N. Y..... { Jun. May 1, 1894 / Assoc. M. Oct. 1, 1902

CRANE, CLARENCE AUSTIN. Civ. Engr. and City Surv., 765 Tremont Ave., Borough of the Bronx, New York City..... Mar. 5, 1902

CRESSON, BENJAMIN FRANKLIN, Jr. Engr. of Alignment, North River Div., P., N. Y. & L. I. R. R., 558 West 33d St., New York City... April 2, 1902

CRESSWELL, HERBERT AUGUSTINE. Res. Engr., Western Australian Govt. Rys., Geraldton, Western Australia..... Oct. 7, 1903

CREW, CHARLES CORWIN. Engr., Morgan County Coal Co., Barnett, Mo..... April 1, 1903

CROSETT, JAMES HAVEN. P. O. Box 117, Exeter, Cal..... Jan. 4, 1905

CUDDEBACK, ALLAN WINTER. Engr. and Supt. of The Passaic Water Co., Paterson, N. J..... April 5, 1899

CUDWORTH, FRANK GRANT. With Cudworth, Axtell & Co., Engrs., 616 K. C. Life Bldg., Kansas City, Mo ..... Jan. 3, 1900

		Date of Membership.
CULGIN, GUY WHITMORE. Vice-Pres. and Treas. of Culgin-Pace Contr. Co., 787 Tremont Ave. (Res., 133 West 129th St.), New York City	Jun.	Mar. 6, 1900
	Assoc. M.	Sept. 7, 1904
CUMMINGS, ELMORE DAVID. 918 East 20th St., Baltimore, Md		Nov. 4, 1903
CUMMINGS, NOAH. Asst. Engr., Dept. of Bridges, 213 West 136th St., New York City	Jun.	Mar. 3, 1896
	Assoc. M.	Jan. 6, 1904
CURTIS, VARNUM PIERCE. 96 Stafford St., Worcester, Mass		Dec. 7, 1904
DALLIS, PARK ANDREW. Greenville, S. C		June 1, 1904
DALRYMPLE, FRANCIS WHARTON. City Engr., Jamestown, N. Y		Feb. 7, 1894
DANA, RICHARD TURNER. Civ. and Cons. Engr., 15 William St., New York City	Jun.	Sept. 11, 1900
	Assoc. M.	Feb. 4, 1903
DAVIS, ARTHUR LINCOLN. Asst. to Pres., Am. Bridge Co. of N. Y., 100 Broadway, New York City	Jun.	April 4, 1893
	Assoc. M.	Oct. 7, 1896
DAVIS, CARLETON EMERSON. Engr. of Water-Works and Sewers, Isthmian Canal Comm., Ancon, Canal Zone, Panama		April 6, 1898
DAVIS, FRED RUFUS. Corps of Engrs., National Board of Fire Underwriters, Committee of Twenty, 135 William St., New York City; Address, Goffstown, N. Y.		Nov. 5, 1902
DAVIS, HAROLD. 1457 Staughton St., Washington, D. C.		Oct. 2, 1901
DAVIS, JAMES LYFORD. Asst. Engr., Aqueduct Comm., Jerome Park Reservoir, Kingsbridge, New York City		May 4, 1904
DAVIS, LEONARD HENRY. Chf. Engr., The Michigan Lake Superior Power Co., The Lake Superior Power Co., Sault Ste. Marie, Ont., Canada		Nov. 5, 1902
DAVIS, WILLIAM RUSSELL. Chf. Bridge Designer and Insp., Office of State Engr. and Surv. of New York, 6th Floor, De Graaf Bldg., Albany, N. Y.		May 2, 1900
DAY, EDWARD BLISS. Care, Mo. Lumber & Min. Co., Grandin, Carter Co., Mo		Feb. 4, 1903
DEANS, CHARLES HERBERT. Phoenixville, Pa	Jun.	Dec. 3, 1890
	Assoc. M.	May 6, 1896
DERLETH, CHARLES, Jr. Assoc. Prof., Structural Eng., Univ. of California, Berkeley, Cal	Jun.	Feb. 1, 1898
	Assoc. M.	Mar. 5, 1902
DE VOU, JAMES LAIRD. Asst. Mgr., Erecting Dept., Am. Bridge Co., Pittsburgh Div., Ambridge, Pa.		April 1, 1903
DE WITT, ELMORE. Civ. Engr. for The Pennsylvania Steel Co. (Res., 348 Spruce St.), Steelton, Pa		Oct. 5, 1898
DIEHR, ALVAH BENJAMIN. U. S. Harbor Impvts., Box 2146, San Pedro, Cal.		Nov. 5, 1902
DILLARD, JOHN LEA. Asst. Engr., N. & W. Ry., Boxley, W. Va.		June 1, 1904
DILLON, FRANCIS HENRY. Civ. Engr. and Contr. (Mackin & Dillon), Apartado 221, Monterey, Nuevo Leon, Mexico		Oct. 3, 1900
DIMON, DANIEL YOUNG. Structural Engr. with Westinghouse, Church, Kerr & Co., New York City (Res., 189 Jefferson Ave., Brooklyn, N. Y.)		Oct. 2, 1901

Date of Membership.

DINGLE, JAMES HERVEY. City Engr., Charleston, S. C.... { Jun. April 30, 1895 / Assoc. M. Oct. 4, 1899

DIXON, DE FOREST HALSTED. Secy., Turner Constr. Co., 166 Remsen St., Brooklyn, N. Y..... { Jun. May 3, 1898 / Assoc. M. Feb. 3, 1904

DOEBLER, VALENTINE SHERMAN. Supt., Transportation, Cam. Steel Co., Johnstown, Pa..... Dec. 6, 1893

DOERFLING, RICHARD GEORGE. Engr., Reclamation Service, Yuma, Ariz..... June 3, 1903

DONHAM, BENJAMIN CURTIS. Chf. Engr. for Collbran & Bostwick, Seoul, Corea..... Jan. 2, 1901

DORRANCE, WILLIAM TULLY. Asst. Engr., Westinghouse, Church, Kerr & Co , 10 Bridge St., New York City..... Sept. 4, 1901

DOTY, JOHN WILLIAMS. Care, Foundation & Constr. Co., 35 Nassau St., New York City..... { Jun. Nov. 3, 1903 / Assoc. M. Jan. 4, 1905

DOUGAN, JAMES. Asst. Engr. with Clinton & Russell, 32 Liberty St., New York City ..... { Jun. Mar. 5, 1901 / Assoc. M. Mar. 2, 1904

DOWNES, ALFRED KIMBALL. Weber Ry. Joint Mfg. Co., 71 Broadway, New York City ..... Feb. 3, 1904

DOWNMAN, JULIAN ROMNEY. Cypress Mfr., 1003 Hibernia Bldg., New Orleans, La..... Dec. 4, 1901

DRAKE, ROBERT MORRIS. Asst. Res. Engr., M. of W. Dept., S. P. Co., 3d and Townsend St. Depot, San Francisco, Cal ..... Mar. 7, 1900

DREW, CHARLES DAVIS. Asst. Engr., Rapid Transit Subway Constr. Co., 350 Fulton St., Brooklyn, N. Y..... Oct. 7, 1903

DU BOIS, JULIAN. Div. Supt., F. J. & G. R. R., Amsterdam, N. Y..... Jan. 8, 1902

DUFOUR, FRANK OLIVER. Asst. Prof. of Civ. Eng., Univ. of Vermont, 28 Brooks Ave., Burlington, Vt. { Jun. Dec. 5, 1899 / Assoc. M. Oct. 1, 1902

DUNCAN, LINDSAY. Cons. Engr., 821 Ernest & Cranmer Bldg., Denver, Colo..... Feb. 3, 1904

DUNN, EMMETT CLARKE. City Engr., Alexandria, Va..... Nov. 4, 1891

DUNN, WILLIAM ROBERT. 139 North 3d St., Easton, Pa..... April 6, 1904

EAVENSON, HOWARD NICHOLAS. Chf. Engr., United States Coal & Coke Co., Gary, McDowell Co., W. Va. ..... Mar. 6, 1901

EDDY, HARRISON PRESCOTT. Supt. of Sewers (Res., 11 Dean St.), Worcester, Mass..... May 7, 1902

EDER, HENRY JAMES. Cali, Colombia..... { Jun. June 5, 1894 / Assoc. M. Sept. 1, 1897

EDWARDS, FREDERICK. Asst. Prof. of Civ. Eng., Union Coll., 860 Union St., Schenectady, N. Y..... { Jun. Jan. 31, 1899 / Assoc. M. Feb. 5, 1902

EDWARDS, WARRICK RIGELEY. Asst. to Engr., Bridges and Bldgs., B. & O. R. R., Mt. Royal Station, Baltimore, Md..... April 4, 1900

EHLE, BOYD. Res. Engr., I. C. C., Bos Obispo, Canal Zone, Panama.. Jan. 3, 1894

ELD, CHARLES JOHN, Jr. Care, City Water Co., East St. Louis, Ill..... May 6, 1903

ELLIOTT, JOHN STUART. Civ. and Min. Engr., 59 Pine St., New York City..... April 6, 1892

Date of Membership.

ELY, JOHN STANTON. Asst. Engr., Belmont Filters, Belmont Ave., Philadelphia, Pa. — Mar. 2, 1904

ENDEMANN, HERMAN KARL. Asst. Engr., Topographical Bureau, Borough of Queens, 250 Jackson Ave., Long Island City, N. Y. — Mar. 6, 1901

ENGSTRÖM, FRANS. Engr., Am. Bridge Co., Ambridge (Res., 417 Ella St., Wilkinsburg), Pa. — May 4, 1892

EVANS, JOHN MAURICE. 162 Wilson St., Brooklyn, N. Y. — Jun. May 4, 1897; Assoc. M. Jan. 3, 1900

EVANS, MYRON EDWARD. Archt. and Engr. (Ballantyne & Evans), 22 Pine St., New York City — Jun. Jan. 3, 1895; Assoc. M. Feb. 7, 1900

EVANS, PETER PLATTER. Contr. Engr., The Osborn Eng. Co., Cleveland, Ohio — Jun. Feb. 6, 1894; Assoc. M. Mar. 7, 1900

FAIN, JAMES RHEA. Supt. of Constr., Federal Bldgs., Hastings, Nebr. — June 4, 1902

FAIRCHILD, JOHN FLETCHER. Engineering Bldg., Mt. Vernon, N. Y. — Jun. April 5, 1892; Assoc. M. Dec. 4, 1895

FAIRCHILD, SAMUEL EDWARDS, Jr. Civ. and Min. Engr. (Fairchild & Gilchrist), 611 Franklin Bldg., Philadelphia, Pa. — Dec. 7, 1904

FALES, FRANK LEWIS. Asst. in Office of Chf. Engr., Commrs. of Water-Works, City Hall, Cincinnati, Ohio — April 6, 1904

FARLEY, PHILIP PATRICK. Asst. Supt., Bergenport Chemical Works, Constable Hook, N. J. (Res., 329 Macon St., Brooklyn, N. Y.) — Jun. Oct. 31, 1893; Assoc. M. Mar. 6, 1901

FARNHAM, CHARLES HENRY. Beverly, Mass. — June 1, 1904

FARQUHAR, HENRY STILSON. 841 Bladensburg Rd., Washington, D. C. — Jun. April 5, 1892; Assoc. M. Nov. 4, 1896

FAY, EDWARD BAYRD. (Brenneke & Fay, Cons. Civ. Engrs.), 1009 Fullerton Bldg., St. Louis, Mo. — Jan. 8, 1902

FENKELL, GEORGE HARRISON. Civ. Engr. to Commrs. of Water-Works (Res., 1062 W. 8th St.), Erie, Pa. — Jun. Jan. 3, 1899; Assoc. M. Oct. 1, 1902

FENTON, LOUIS GILLESPIE. 22 William St., New York City. — Feb. 1, 1905

FERGUSON, JAMES EASTON. Cons. and Structural Engr., 735 Fourteenth Ave., Detroit, Mich — June 1, 1904

FERGUSON, JOHN NEIL. Asst. Engr., Charles River Basin Comm., 367 Boylston St., Boston, Mass. — Oct. 2, 1901

FERGUSON, WILLIAM HASTINGS. With The Mountain Copper Co., Ltd., 115 Frederick St., San Francisco, Cal. — Jan. 7, 1903

FERRIS, FREDERICK EDWARD. 820 Montgomery St., Jersey City, N. J. — June 1, 1898

FETHERSTON, JOHN TURNEY. Asst. Engr. and Acting Supt. of Street Cleaning, Public Works, Richmond Borough, Richmond Bldg., New Brighton, N. Y. — June 3, 1903

FIELD, FREDERICK ELBERT. Div. Engr., Bureau of Filtration, Pittsburg, Pa. — Oct. 7, 1903

FISH, JOHN CHARLES LOUNSBURY. Assoc. Prof., Civ. Eng., Stanford Univ., 382 Lincoln Ave., Palo Alto, Cal. — Jun. Jan. 31, 1893; Assoc. M. Feb. 7, 1900

Date of Membership.

FITZGERALD, CHRISTOPHER COLUMBUS. Roadmaster, Chatta. Div., C., N. O. & T. P. Ry. Co., Somerset, Ky. ..... Oct. 2, 1901

FLINN, ALFRED DOUGLAS. Gen. Insp., Aqueduct Commrs., 280 Broadway, New York City. ..... Dec. 6, 1899

FLYNN, JOHN, Jr. Civ. and Elec. Engr.; City Engr., 83 Third St., Troy, N. Y. ..... Jan. 8, 1902

FOCHT, LOUIS. Engr. to State Board of Assessors; Cons. Engr., Trenton, N. J. ..... May 4, 1892

FORD, FREDERICK LUTHER. City Engr., Hartford, Conn. ..... Oct. 1, 1902

FORD, ROBERT HENRY PERSSE. Asst. Engr., Cent. Vt. Ry., St. Albans, Vt. ..... { Jun. Mar. 2, 1897 / Assoc. M. June 7, 1899

FORD, WILLIAM HAYDEN. 506 Hale Bldg., Philadelphia, Pa. ..... { Jun. Nov. 5, 1895 / Assoc. M. June 3, 1903

FOSTER, MORTIMER. (Foster, Gade & Graham, Archts.), 281 Fourth Ave., New York City. ..... June 1, 1904

FOSTER, THOMAS J. Pres., National Bridge Works, 1123 Broadway, New York City. ..... Feb. 1, 1899

FOX, WALTER GORDON. 26 West 47th St., New York City ..... Jan. 2, 1901

FOYÉ, ANDREW ERNEST. Secy. and Treas., Ryan-Parker Constr. Co., 21 Park Row, New York City. ..... { Jun. May 2, 1893 / Assoc. M. Nov. 4, 1896

FRANKLIN, BENJAMIN. Civ. and Cons. Engr. (Franklin & Clarke), 907 Crozer Bldg., Philadelphia, Pa. ..... April 1, 1903

FRASER, CHARLES EDWARD. 684 St. Nicholas Ave., New York City. ..... { Jun. June 4, 1901 / Assoc. M. Sept. 2, 1903

FRAZEE, JOHN HATFIELD. 516 West 183d St., New York City. ..... Dec. 6, 1899

FRAZIER, JAMES WELCH. Care, Brown Hoisting Machinery Co., Cleveland, Ohio ..... May 6, 1903

FREITAG, JOSEPH KENDALL. New England Agt., Hecla Iron Works, 166 Devonshire St., Boston, Mass. ..... Jan. 3, 1900

FRENCH, FRANK CHAUNCEY. Asst. Prof., Civ. Eng., Iowa State Coll., Ames, Iowa. ..... Dec. 3, 1902

FREW, ROBERT DICKSON ALISON. Chelmer, near Brisbane, Queensland, Australia. ..... June 1, 1898

FRICK, WALTER. Lewisburg, Union Co., Pa. ..... Dec. 2, 1896

FRINK, FRED GOODRICH. Asst. Prof., Civ. Eng., Univ. of Ill., Urbana, Ill. ..... May 3, 1899

FROST, GEORGE SHERMAN. Asst. Engr., Rapid Transit R. R. Comm., 1947 Broadway, New York City. ..... { Jun. April 2, 1901 / Assoc. M. Jan. 7, 1903

FULLER, ANDREW DANIEL. Contr. Engr., 3 Hamilton Pl., Boston, Mass. ..... { Jun. Dec. 6, 1898 / Assoc. M. Jan. 6, 1904

FULLER, CARL HAMILTON. 360 West 19th St., New York City. ..... { Jun. Mar. 5, 1901 / Assoc. M. Feb. 3, 1904

GALBREATH, WILLIAM OTTO. Utica, Mo. ..... April 6, 1904

GARDINER, FREDERICK WILLIAM. Prin. Asst. Engr., Interborough Rap. Trans. Co., Manhattan Ry. Div., 32 Park Pl., New York City. ... Dec. 6, 1899

GARRETT, JOHN THOMAS. Pres., Missouri Bridge & Iron Co., 715 Locust St., St. Louis, Mo. ..... May 1, 1901

	Date of Membership.	
GARRETT, ROBERT PEEL. Asst. Sewer Commr., Room 311, New City Hall, St. Louis, Mo.	Jun.	Jan. 4, 1898
	Assoc. M.	Oct. 2, 1901
GARRISON, FRANK LYNWOOD. 726 Drexel Bldg., Philadelphia, Pa.		Sept. 7, 1892
GARTENSTEIG, CHARLES. Asst. Engr., Bureau of Highways, Borough of the Bronx, 177th St. and Third Ave. (Res., 12 East 87th St.), New York City.	Jun.	Oct. 6, 1896
	Assoc. M.	May 6, 1903
GAYLER, ERNEST ROTTECK. Civ. Engr., U. S. N., Navy Yard, New London, Conn.		April 6, 1904
GESSNER, GUSTAVUS ADOLPHUS, Jr. Civ. and Cons. Engr. (The Riggs & Sherman Co.), 613 The Nasby, Toledo, Ohio.		April 2, 1902
GIDEON, ABRAHAM. Asst. Engr., Cons. Engr.'s Office, Manila, Philippine Islands.		Sept. 3, 1902
GIFFORD, LESTER ROBINSON. Office of Structural Engr., Cambria Steel Co., Johnstown, Pa.	Jun.	Mar. 3, 1896
	Assoc. M.	Dec. 3, 1902
GIFFORD, ROBERT LADD. Pres., Illinois Eng. Co., Cons. Engrs., 319 Manhattan Bldg., Chicago, Ill.		May 6, 1903
GILKEY, THOMAS ALVIN. With Pennsylvania Eng. Works, New Castle, Pa.		Oct. 3, 1900
GILLESPIE, RICHARD HENWOOD. Asst. Engr., Bureau of Highways, Bronx (Res., 2774 Briggs Ave., Bedford Park), New York City.		Oct. 3, 1900
GIVEN, RICHARD ALEXANDER. Office Engr., Frisco System, 364 Randolph Bldg., Memphis, Tenn.		Feb. 3, 1904
GLAZIER, WILLIAM LEONARD. Civ. Engr. and Supt., Newport Water-Works, Newport, Ky.		Oct. 7, 1903
GODDARD, LESLIE WARREN. U. S. Asst. Engr., Grand Rapids, Mich.		Mar. 2, 1892
GOLDSMITH, NATHANIEL OLIVER. Chf. Engr., The Weir Frog Co., East Norwood, Ohio.	Jun.	June 2, 1886
	Assoc. M.	June 6, 1900
GOVE, WILLIAM GRANVILLE. Asst. Mech. Engr., Brooklyn Rapid Transit Co., 168 Montague St., Brooklyn, N. Y.		Feb. 3, 1904
GOW, CHARLES RICE. 25 Montview St., West Roxbury, Mass.		June 1, 1904
GOWEN, SUMNER. Asst. Engr., Phœnix Bridge Co., Phœnixville, Pa.	Jun.	May 2, 1899
	Assoc. M.	June 4, 1902
GRANBERY, JULIAN HASTINGS. 561 Walnut St., Elizabeth, N. J.	Jun.	Sept. 6, 1898
	Assoc. M.	Sept. 2, 1903
GRANT, THOMAS HENRY. Red Bank, N. J.		May 6, 1891
GRAVELLE, ALVIN. Estimating Dept., Am. Bridge Co., Van Buren and Clark Sts., Chicago, Ill.		Nov. 6, 1901
GRAVES, WILLARD FRANKLIN. Asst. Engr., So. Side Elev. Ry., 450 Thirty-seventh Pl., Chicago, Ill.	Jun.	Oct. 31, 1899
	Assoc. M.	Jan. 4, 1905
GRAY, EDWARD, Jr. Prin. Asst. Engr., Tidewater Ry. Co., Roanoke, Va.		Jan. 2, 1895
GRAY, WILLIAM. Asst. Engr., Bureau of Sewers, Borough of Bronx, New York City.	Jun.	May 2, 1888
	Assoc. M.	Mar. 1, 1893
GREEN, ANDREW H. 403 La Salle Ave., Chicago, Ill.		Oct. 2, 1901
GREEN, CHARLES NEWTON. Asst. Engr., Rapid Transit Comm., 1947 Broadway, New York City.		June 3, 1903
GREEN, FRED MAY. Care, P., N. Y. & L. I. R. R., 1 West 34th St., New York City.		April 6, 1904

		Date of Membership.
Greenalch, Wallace. Supt., Bureau of Water, Albany, N. Y.	Jun.	April 3, 1894
	Assoc. M.	June 7, 1899
Greene, Albert Emerson. Asst. Prof., Civ. Eng., Univ. of Mich., 415 E. William St., Ann Arbor, Mich		May 4, 1904
Greene, Carleton. (Greene & Greene, Cons. Engrs.), 11 Broadway, New York City		Mar. 3, 1897
Greene, Frederick Stuart. Cons. Engr., The Am. Mfg. Co., 65 Wall St., New York City		June 7, 1899
Greene, Howard Arnold. Div. Erecting Mgr., Am. Bridge Co., Pittsburg, Pa		June 5, 1895
Greene, Robert Maxson. Structural Engr.'s Office, Cambria Steel Co., Johnstown, Pa		June 1, 1898
Greenwood, Albert Henry. 184 Jackson St., Lawrence, Mass		Feb. 1, 1905
Gregory, Charles Emerson. 2471 Davidson Ave., Bronx, New York City	Jun.	Oct. 6, 1896
	Assoc. M.	Mar. 6, 1901
Gregory, John Herbert. Prin. Asst. Engr., Water Purification and Sewage Disposal, Dept. of Public Service, Columbus, Ohio	Jun.	Jan. 3, 1899
	Assoc.M.	April 3, 1901
Griffith, Lawrence. Engr. of M. of W., Grand Central Station and Harlem Line, Grand Central Station, New York City (Res., 7 Lincoln Terrace, Yonkers, N. Y.)		May 2, 1900
Griswold, Ray Elliott. Supt., The Barber Asphalt Paving Co., Madison, Ill		Oct. 1, 1902
Gross, Daniel Wingerd. 1300 Eutaw Pl., Baltimore, Md		May 1, 1901
Grover, Nathan Clifford. Engr., U. S. Geological Survey, Washington, D. C		Mar. 2, 1904
Gubelman, Frederick Joseph. Vice-Pres., O'Rourke Eng. Constr. Co., 1 West 34th St., New York City		Oct. 2, 1895
Gudewill, Charles Edward. Vice-Pres., Montreal Pipe Foundry Co., P. O. Box 2304, Montreal, Que., Canada		Sept. 1, 1897
Gudmundsson, Gisli. 407 Fourth Ave., Room 205, Pittsburg, Pa		Jan. 3, 1900
Gueringer, Louis Amedee. Div. Engr., St. L., B. & M. Ry., Corpus Christi, Tex		May 7, 1902
Haas, Edward Francis. 320 Sansome St., San Francisco, Cal	Jun.	Feb. 6, 1894
	Assoc. M.	Sept. 5, 1900
Hagar, Edward McKim. Mgr., Cement Dept., Illinois Steel Co., 1057 The Rookery, Chicago, Ill		Feb. 6, 1901
Haight, Horace De Remer. Engr. for Thomas Prosser & Son, 15 Gold St., New York City; Address, 488 Western Ave., Albany, N. Y.	Jun.	May 1, 1900
	Assoc. M.	Feb. 4, 1903
Hain, James C. Engr., Masonry Constr., C. M. & St. P. Ry., 1232 Ry. Exchange, Chicago, Ill		May 1, 1901
Haines, Eugene Grove. Asst. Engr., Rapid Transit R. R. Comm., Battery Park, New York City		May 1, 1901
Hall, Charles Romney. U. S. Engr. Dept., Fort McKinley, Portland Harbor, Me		Jan. 7, 1903

Date of Membership.

HALL, LOUIS WELLS. Asst. Engr., New York State Engr. Corps, Albany, N. Y. — Oct. 1, 1902

HALLIHAN, JOHN PHILIP. Supt., Rys., Cananea Cons. Copper Co., Cananea, Sonora, Mexico — April 4, 1900

HAM, WILLIAM HALE. 156 Fifth Ave., New York City — Nov. 5, 1902

HAMLIN, WILLIAM ELIOT. Hotel Marie Antoinette, 66th Street and Broadway, New York City — Dec. 2, 1903

HAMMATT, WILLIAM CUSHING. Engr. with Mountain Copper Co., Martinez, Cal. — Sept. 5, 1900

HANKINSON, ALBERT WORTHINGTON. 62 West 85th St., New York City. — Oct. 7, 1903

C. HARBY, ISAAC. Engr. for John A. Roebling's Sons Co., Trenton, N. J. — Jun. June 6, 1899; Assoc. M. May 6, 1903

HARDIN, ABRAHAM TRACY. Engr., M. of W., N. Y. C. & H. R. R. R., Grand Central Station, New York City — Mar. 2, 1904

HARDISON, ALLEN CROSBY. Civ. and Min. Engr., 406 Douglas Blk., Los Angeles, Cal. — Feb. 6, 1901

HARDY, HARRY. 29 Maxilla Gardens, Holland Park, London, W., England — June 1, 1892

HARLOW, JAMES HAYWARD, Jr. Asst. Engr., Susquehanna Canal & Power Co., Conowingo, Md — Mar. 5, 1902

HARMAN, JACOB ANTHONY. 109 South Jefferson Ave., Peoria, Ill. — May 4, 1898

HARPER, AUSTIN CURTIN. Res. Engr., Panama Canal, Care, Chf. Engr.'s Office, Ancon, Canal Zone, Panama — Jan. 7, 1903

HARPER, ISAAC ONWARD. Secy. and Treas., Lauer & Harper Co., Baltimore, Md — May 7, 1902

HARRINGTON, FERDINAND FINNEY. Bridge Dept., N. Y. C. & H. R. R. R. Co., Grand Central Station, New York City — May 3, 1899

HARTE, CHARLES RUFUS. Asst. Engr., N. Y., N. H. & H. R. R., 168 Olive St., New Haven, Conn — Jun. April 4, 1899; Assoc. M. May 2, 1900

HARTIGAN, FREDERICK LAWRENCE. Engr. and Contr., 4920 Washington Ave., Chicago, Ill. — May 6, 1903

HARTWELL, HARRY. Asst. Engr., Ford, Bacon & Davis, 24 Broad St., New York City — Jun. Jan. 2, 1894; Assoc. M. Feb. 2, 1898

HARWOOD, GEORGE ALEC. Engr., Grade Crossing Elimination, N. Y. C. & H. R. R. R., Grand Central Station, New York City — Feb. 5, 1902

HASTINGS, FRANK ARNOLD. Asst. Engr., Riverside Bridge Co., Martin's Ferry, Ohio — Dec. 3, 1902

HATT, WILLIAM KENDRICK. Prof. of Applied Mechanics, Purdue Univ., Lafayette, Ind. — June 4, 1902

HAUCK, WILLIAM. Asst. Engr., Aqueduct Comm., Jerome Park Reservoir, New York City — June 5, 1901

HAWES, LOUIS EDWIN. Civ. and Hydr. Engr., 101 Tremont St., Boston, Mass. — Sept. 2, 1896

HAWLEY, GEORGE PRINCE. Asst. Engr., Care, Shawinigan Water & Power Co., Montreal, Que., Canada — Feb. 6, 1901

HAWXHURST, ROBERT, Jr. Chf. Engr., Kohala & Hilo Ry. Co., Hilo, Hawaii — Sept. 7, 1904

Date of Membership.

HAYCROFT, JAMES ISAAC. Fontenoy, The Grove, Queen St., Woollahra, New South Wales, Australia ..... Jan. 3, 1894

HAYDEN, JOHN BRUCE. Bridge Dept., N. Y. C. & H. R. R. R., Room 500, Grand Central Station, New York City ..... May 2, 1900

HAYES, MORGAN DODGE. Am. Water-Works & Guarantee Co., Bank for Savings Bldg., Pittsburg, Pa ..... April 1, 1903

HAYFORD, JOHN FILLMORE. Insp. of Geodetic Work and Chf. of Computing Div., Coast and Geodetic Survey, Washington, D. C ..... May 6, 1896

HAYS, DON. Res. Engr., Midland Val. R. R., Care, Lewis Rogers, Ramona, Ind. T ..... May 6, 1903

HAZARD, ERSKINE. Box 3197, Johannesburg, Transvaal, South Africa ..... Oct. 2, 1895

HAZEN, WILLIAM NELSON. Cons. and Contr. Engr. (Frink & Hazen), 711 Union Trust Bldg., Baltimore, Md ..... Dec. 3, 1902

HAZLETT, ROBERT. City Bank Bldg., Wheeling, W. Va ..... Mar. 4, 1896

HEINDLE, WILLIAM ALBERT. Asst. Engr., J. G. White & Co., 43 Exchange Pl., New York City ..... Nov. 6, 1901

HELM, EDWIN GUY. Civ. and Cons. Engr., 230 Collinsville Ave., East St. Louis, Ill ..... Dec. 5, 1900

HENDERSON, JOHN THOMAS. Asst. Engr., Conn. River Bridge and Highway Dist., Hartford, Conn ..... Sept. 3, 1902

HENDRICKS, VICTOR KING. Asst. to Engr., M. of W., B. & O. R. R. Co., 111 West Saratoga St., Baltimore, Md ..... May 1, 1895

HENGST, ROBERT GRAHAM. Asst. Chf. Engr., West. Allegheny R. R. Co., 301 Smithfield St., Pittsburg, Pa ..... Oct. 7, 1903

HENRY, FRANCIS MAXWELL. Lumber Exchange, Minneapolis, Minn ... Mar. 4, 1896

HENRY, PHILIP WALTER. Vice-Pres., Pan American Co., 17 Battery Pl., New York City ..... Jan. 3, 1894

HERRICK, JOHN JAMES. 161 Franklin Pl., Flushing, N. Y ..... June 6, 1900

HERRING, WILLARD E. Silver Springs, Md ..... Sept. 4, 1901

HIGHLEY, LEE. B. and B. Dept., Mo. Pac. Ry., Pacific, Jun. Dec. 7, 1897
Mo ..... Assoc. M. Dec. 4, 1901

HILL, CURTIS. Engr., Sewer Dept., St. Louis, Mo ..... Oct. 2, 1901

HILL, EDWIN ALLSTON. Asst. Examiner, Classification Div., U. S. Patent Office, Washington, D. C ..... May 3, 1893

HILL, JOHN EDWARD. Prof. of Civ. Eng., Brown Univ., Providence, R. I ..... May 4, 1892

HILL, THEODORE WILLIAM. 613 The Nasby, Toledo, Ohio ..... Mar. 7, 1900

HILL, WALTER ARTHUR. Chf. Engr., Ferrocarril de Veracruz al Pacifico, Orizaba, Veracruz, Mexico ..... Sept. 2, 1896

HILLER, JOHN AUGUSTUS. Res. Engr., Cincinnati New Water-Works, 2385 Eastern Ave., Cincinnati, Ohio ..... Sept. 7, 1904

HILLIARD FOSTER HAVEN. 244 Atkinson Ave., Memphis, Tenn ..... Mar. 6, 1901

HIRST, ARTHUR. Asst. Engr., Engr. Dept., Am. Bridge Co., Pencoyd, Pa. Dec. 3, 1902

HITE-SMITH, VAN DUSEN. Cons. Engr., Knoxville, Tenn ..... April 3, 1901

HOBBY, ARTHUR STANLEY. Guantanamo, Cuba ..... Sept. 4, 1901

	Date of Membership.
HODGMAN, HARRY. U. S. Junior Engr., Amherstburg, Ont., Canada..	Mar. 2, 1904
HOGUE, CHARLES JAY. Watsontown, Pa.	Dec. 7, 1898
HOLBROOK, PERCY. Gen. Mgr., The Weber Ry. Joint Mfg. Co., 71 Broadway, New York City.	Mar. 2, 1898
HOLDREGE, HENRY ATKINSON. Gen. Mgr., Omaha Elec. Light & Power Co., Omaha, Nebr	Dec. 7, 1904
HOLLIDAY, ALEXANDER RIEMAN. Engr., M. of W., I. & V. Div., Penn. Co., Union Station, Indianapolis, Ind.	Jun. Oct. 7, 1902 Assoc. M. Feb. 1, 1905
HOLMES, GLENN DICKINSON. Computer, New York State Barge Canal, De Graaf Bldg., Albany, N. Y.	June 5, 1901
HOMAN, WILLIAM MACLEAN. Bethlehem, Orange River Colony, South Africa	June 7, 1899
HONE, FREDERIC DE PEYSTER. (Chambers & Hone), 60 New St., New York City..	Jun. April 4, 1899 Assoc. M. Feb. 5, 1902
HONNESS, GEORGE GILL. Gen. Insp., N. Y. Aqueduct Comm., Pawling, Dutchess Co., N. Y.	Jun. Feb. 2, 1897 Assoc. M. Sept. 4, 1901
HOPKINS, ALBERT LLOYD. Asst. Gen. Mgr., Newport News Shipbuilding & Dry Dock Co., Newport News, Va...	Jun. April 3, 1894 Assoc. M. April 3, 1901
HORSTMAN, JOSEPH PROSPER. Engr., Parkersburg, Marietta & Inter-Urban Ry. Co., Parkersburg, W. Va	Dec. 7, 1904
HORTON, ROBERT ELMER. 75 Arcade, Utica, N. Y.	Dec. 7, 1904
HORTON, THEODORE. Res. Engr., Sewerage works, 47 East Market St., York, Pa.	Jun. Aug. 31, 1897 Assoc. M. April 4, 1900
HOUSTON, GAVIN NELSON. Acting Prof. of Civ. and Irrigation Eng., Colorado Agri. Coll., Fort Collins, Colo..	Jun. May 4, 1897 Assoc. M. Nov. 7, 1900
HOWARD, CHARLES POPE. Chf. Engr., Tidewater Ry., Beckley, W. Va.	Jan. 3, 1894
HOWE, GEORGE EDWARD. Asst. Engr. of Design, Board of Public Service, Columbus, Ohio.	Mar. 4, 1903
HOWE, JOSEPH MILTON. Cons. Engr., 229 Commercial Bank Bldg., Houston, Tex.	Feb. 4, 1903
HOYT, JOHN CLAYTON. U. S. Geological Survey, Washington, D. C...	May 4, 1904
HOYT, JOHN T NOYE. (Hoyt & Mackintosh, Archts.), 11 East Pleasant St., Baltimore, Md.	Jun. Feb. 28, 1893 Assoc. M. Mar. 2, 1898
HUBBARD, WINFRED DEAN. Supt. of Water-Works and Sewers, Concord, Mass.	Nov. 5, 1902
HUBBELL, GEORGE SCOTT. Engr., National Board of Fire Underwriters, 135 William St., New York City	June 1, 1904
HUESTIS, CHARLES CALVIN. Civ. Engr. and Contr., 118 Norwood Ave., Buffalo, N. Y.	Mar. 6, 1901
HUGHES, FRANCIS DEY. Eng. Dept., Virginia Bridge & Iron Co. (Res., 504 West Church Ave.), Roanoke, Va.	Sept. 3, 1902
HUMPHREY, HENRY CYPRIAN. Provincial Superv., Lucena, Tayabas Province, Philippine Islands.	Sept. 4, 1901
HUMPHREYS, CLIFTON STEWART. Mill Archt. and Engr. (Snow & Humphreys), 85 Water St., Boston, Mass. (also Madison, Me.)..	May 2, 1900
HUNICKE, WILLIAM AUGUST. 2937 Henrietta St., St. Louis, Mo.	Mar. 2, 1904
HUNT, LOREN EDWARD. Engr. of Tests, U. S. Bureau of Forestry, Berkeley, Cal	June 3, 1903

Date of Membership.

HUNTER, ROBERT EASTON. 644 St. Denis St., Montreal, Que., Canada ..... Nov. 6, 1901

HUNTINGTON, GEORGE DANFORTH. Asst. Engr., New York Air Brake Co., Watertown, N. Y. ..... Dec. 7, 1904

HUSTON, TILLINGHAST L'HOMMEDIEU. Gen. Contr., 36 Obispo, Havana, Cuba ..... May 2, 1900

HYDE, CHARLES GILMAN. Asst. Engr. in Chg. (Filtration Investigations, Design and Constr.), Board of Public Works, Harrisburg, Pa ..... April 2, 1902

HYDE, WILLIAM HERBERT. Supt. for W. F. Patterson, Contr., Lourdes, N. S., Canada ..... Jun. April 30, 1901; Assoc. M. June 4, 1902

ILSLEY, ARTHUR BENJAMIN. Asst. Engr., Southern Ry., 1300 Penn. Ave., Washington, D. C. ..... Jun. Feb. 28, 1899; Assoc. M. Mar. 4, 1903

INGRAM, EDWARD LOVERING. Expert Aid (Civ. Engr.), Dept. of Yards and Docks, New York Navy Yard (Res., 11 Willoughby Ave.), Brooklyn, N. Y ..... Sept. 4, 1895

JACKSON, GRANBERY. Adj. Prof., Eng., Vanderbilt Univ.; Hydr. and Municipal Engr., Nashville, Tenn ..... Jan. 4, 1905

JACKSON, JAMES MADISON. Pres. and Gen. Mgr., Everglade Cypress Lumber Co., Parkersburg, W. Va. ..... Jan. 2, 1901

JACKSON, JOHN FRANKLIN. Contr. Engr., Wisconsin Bridge & Iron Co., Houghton, Mich. ..... May 2, 1894

JACOBS, JOSEPH. U. S. Reclamation Service, San Francisco, Cal. ..... Sept. 4, 1901

JACOBS, ROBERT HYDE. 244 West 42d St., New York City ..... May 4, 1904

JANNEY, THOMAS GORDON. Gen. Mgr., Centerville Dredging Co., Centerville, Idaho ..... Oct. 3, 1900

JANVRIN, NED HERBERT. Asst. Engr., Am. Bridge Co. of N. Y., Erection Dept., Pitts. Div., 1304 Union Trust Bldg., Cincinnati, Ohio ..... Jun. Oct. 5, 1897; Assoc. M. June 5, 1901

JARRETT, EDWIN SETON. Of The Foundation Co., 35 Nassau St., New York City ..... May 1, 1895

JAUDON, HENRY SCUDDER. Elberton, Ga. ..... Feb. 4, 1903

JENCKES, LAWRENCE BATES. Stamford, Conn ..... Jun. Mar. 31, 1891; Assoc. M. Oct. 7, 1896

JOHNSON, ALEXANDER. Asst. Engr., Dept. of Bridges, 13 Park Row, New York City ..... Sept. 5, 1900

JOHNSON, ARTHUR NEWHALL. Highway Engr., Maryland Geological Survey, Baltimore, Md ..... Sept. 2, 1903

JOHNSON, RANKIN. Asst. Chf. Engr., Mex. International R. R. Co., Durango, Durango, Mexico ..... Feb. 7, 1900

JOHNSON, WILLIAM EDWARD. Chf. Engr. for Hartford Water Comm., P. O. Box 37, West Hartford, Conn ..... April 3, 1901

JOHNSON, WILLIAM STONE. Asst. Engr., Mass. State Board of Health, Room 140, State House, Boston, Mass. ..... June 6, 1894

JOHNSTON, JOHN PARRY. 1034 National Life Bldg., Chicago, Ill ..... Assoc. April 3, 1894; Assoc. M. Nov. 1, 1904

		Date of Membership.
	JOHNSTONE, WILLIAM BARD. Asst., Penn., N. Y. & L. I. R. R. Co., 22 West 25th St., New York City	May 4, 1904
	JONES, HENRY LLEWELLYN. Res. Engr., U. S. Steel Products Export Co., Sydney, New South Wales, Australia	Oct. 5, 1898
	JONES, THOMAS JOHN. Supt. of Mines, Mountain Copper Co., Ltd., Iron Mt., Keswick, Cal.	June 1, 1904
	JONSON, ERNST FREDRIK. Care, Lewinson & Co., 128 West 42d St., New York City	Jan. 3, 1900
	JORDAN, WILLIAM FREDERICK. Res. Engr., N. Y. C. & H. R.R. R., 33 Church St., White Plains, N. Y.	April 1, 1891
C.	KAHN, JULIUS. Pres., Trussed Concrete Steel Co., Union Trust Bldg., Detroit, Mich	Jun. May 3, 1898 Assoc. M. Oct. 3, 1900
	KEAYS, REGINALD HORTON. Asst. Engr., Hudson River Impvt. Co., Ft. 15th St., Jersey City, N. J.	Jun. June 6, 1899 Assoc. M. April 3, 1901
	KEIM, WARREN BYRON. Asst. Engr., Bridge and Constr. Dept., Pennsylvania Steel Co., 129 N. 4th St., Harrisburg, Pa	Jan. 4, 1905
	KELLER, CHARLES LINCOLN. First Asst. Engr., The Scherzer Rolling Lift Bridge Co., 1616 Monadnock Blk., Chicago, Ill.	Jun. Oct. 4, 1898 Assoc. M. Mar. 6, 1901
	KELLEY, JAMES AUGUSTUS. Engr., T. H. Clement & Co., Contrs., Land Title Bldg., Philadelphia, Pa.	Assoc. Mar. 5, 1901 Assoc. M. Sept. 2, 1903
	KELLOGG, ALBERT VICTOR. Engr., M. of W., Houston & Tex. Cent. R. R. Co., Houston East & West Ry. Co. and Houston & Shreveport R. R. Co., Houston, Tex	Nov. 6, 1895
	KELLY, WILLIAM. Capt., Corps. of Engrs., U. S. A., Ft. Leavenworth, Kans.	Feb. 3, 1904
	KENNEY, EDWARD FULBISTER. Engr. of Tests, P. R. R., Broad St. Station, Philadelphia, Pa.	Jun. Nov. 3, 1896 Assoc. M. May 3, 1899
R.	KENYON, GEORGE CECIL. Engr.'s Dept., Mersey Docks and Harbor Board, Liverpool, England	April 4, 1900
	KETCHUM, MILO SMITH. Prof. of Civ. Eng., Univ of Colorado, Boulder, Colo	Sept. 4, 1901
	KIEFFER, STEPHEN EPHRAIM. 2515 Dwight Way, Berkeley, Cal.	Oct. 5, 1904
	KIMBALL, WILLIAM HALE. Civ. and Cons. Engr., 114 W. Third St., Davenport, Iowa	April 1, 1903
	KINSEY, FRANK WILMARTH. P. O. Box 3581, Boston, Mass.	Jun. Feb. 2, 1892 Assoc. M. Dec. 7, 1898
	KLOSSOWSKI, THEODORE JULIUS. Dixon, Ill.	April 6, 1904
	KNAP, EDGAR DAY. Asst. Engr., Dept. of Bridges, 84 Broadway, Brooklyn, N. Y.	Jun. Dec. 1, 1896 Assoc. M. Dec. 4, 1900
	KNIGHT, FRANK BARR. Engr., Cableway Dept., Lidgerwood Mfg. Co., 96 Liberty St., New York City	Sept. 4, 1901
	KNOCH, JULIUS JAMES. Prof. of Civ. Eng., Univ. of Arkansas, Fayetteville, Ark.	Oct. 2, 1901
	KNOWLTON, THEODORE ELY. Civ. Engr. and Contr., Denver, Colo.	Assoc. Mar. 31, 1896 Assoc. M. May 7, 1902

Date of Membership.

KOENIG, ARNOLD CHARLES. Cons. and Contr. Engr. and Water Commr., 514 Bee Bldg., Omaha, Nebr. ..... Nov. 7, 1900

C. KUMMER, FREDERIC ARNOLD. Treas. and Gen. Mgr., United States Wood Preserving Co., 29 Broadway, New York City. ..... Jun. April 30, 1895; Assoc. M. Mar. 4, 1903

KYLE, GEORGE ALLAN. Care, E. J. Pearson, Chf. Engr., N. P. Ry. Co., St. Paul, Minn. ..... Feb. 2, 1892

LACKEY, OSCAR FRANCIS. Asst. Engr., Docks and Piers, Sub-Dept., Harbor Board, Baltimore, Md. ..... May 4, 1904

LAMB, ERNEST AVERY. Asst. Engr., Dept., State Engr. and Surv., State Hall, Albany, N. Y. ..... Sept. 7, 1904

LAMBERT, WALLACE CORLISS. Gleasondale, Mass. ..... April 4, 1900

LANE, EDWIN GRANT. Div. Engr., B. & O. R. R., New Castle, Pa .... Jan. 8, 1902

LANE, FREDERICK EUGENE. Address unknown ..... Oct. 1, 1902

LANE, HARRY ALFRED. Room 8, Walsh Bldg., Cumberland, Md. ..... Feb. 1, 1905

LASLEY, CHARLES ORTON. Asst. Engr., The Riggs & Sherman Co., 613 The Nasby, Toledo, Ohio ..... May 4, 1904

LATHBURY, BENJAMIN BRENTNALL. Pres., Alma Cement Co., Land Title Bldg., Philadelphia, Pa. ..... Mar. 3, 1897

LATTA, HARRISON WAINWRIGHT. Pres., Latta & Terry Constr. Co., Pennsylvania Bldg., Philadelphia, Pa. ..... Sept. 5, 1900

LAVELLE, THOMAS MONAHAN. Engr., Yards and Bldgs., Am. Bridge Co., Ambridge, Pa. ..... Sept. 7, 1904

LAVIS, FRED. Asst. Engr., Westinghouse, Church, Kerr & Co., 10 Bridge St., New York City ..... Sept. 6, 1899

LAW, ARTHUR PRICE. Supt. of Constr., Holbrook, Cabot & Rollins Corp., Bridgeport, Conn. ..... June 3, 1903

LAWLOR, THOMAS FRANCIS. 220 Broadway, New York City. ..... Jun. June 5, 1889; Assoc. M. May 2, 1894

LAWSON, THOMAS R. Asst. Prof. of Mechanics, Rens. Poly. Inst., 99 Twelfth St., Troy, N. Y. ..... June 3, 1903

LAWTON, PERRY. 7 Savings Bank Bldg., Quincy, Mass. .... Jun. Jan. 3, 1893; Assoc. M. Sept. 2, 1896

LAWTON, WALTER LUMAN. Engr. and Contr., 132 Chestnut St., Albany, N. Y. ..... Mar. 5, 1902

LEAVENWORTH, GEORGE STEVENS. Chf. Engr., Powers & Mansfield Co., 280 River St., Troy, N. Y. ..... June 3, 1903

LEAVITT, CHARLES WELLFORD, Jr. Civ. and Landscape Engr., 15 Cortlandt St., New York City. ..... Jan. 4, 1898

LEE, DAVID READ. Care, Water Commrs., Middletown, N. Y. ..... Oct. 7, 1896

LEE, ENGBERT A. Cons. Engr., 527 Seventeenth St., Denver, Colo... Oct. 7, 1903

LEEPER, JOHN BIGGER. Engr. with the Am. Bridge Co., 818 Frick Bldg., Pittsburg, Pa. ..... Jan. 3, 1900

LEFFINGWELL, FRANK DODGE. Res. Engr., East River Tunnel Div., Brooklyn Extension, Rapid Transit Subway Constr. Co., 350 Fulton St., Brooklyn, N. Y. (Res., 13 Lexington Ave., Montclair, N. J.) ..... Oct. 5, 1898

Date of Membership.

LEFFLER, BURTON RUTHERFORD. Chf. Draftsman, Bridge Dept., L. S. & M. S. Ry., 17 Olive Pl., Cleveland, Ohio. ..... April 6, 1904

LELAND, ORA MINER. Instr. in Civ. Eng., Cornell Univ., 127 Cascadilla Pl., Ithaca, N. Y. ..... Feb. 1, 1905

LENTILHON, EUGENE. Cons. Engr., 37 West 44th St., New York City ..... { Jun. Mar. 1, 1891; Assoc. M. Mar. 6, 1895

LEPPER, FRED WILLIAM. Supt. of Constr., U. S. Custom House, Memphis, Tenn ..... Jan. 2, 1901

LEWERENZ, ALFRED COURTNEY. Civ. Engr., U. S. N., U. S. Navy Yard, Bremerton, Puget Sound, Wash. ..... { Jun. Mar. 5, 1895; Assoc. M. June 6, 1900

LEWIS, CLARENCE MCKENZIE. Care, Wm. Salomon & Co., 25 Broad St., New York City ..... Dec. 3, 1902

LEWIS, CLIFFORD, Jr. Second National Bank Bldg., Utica, N. Y. .... Sept. 2, 1903

LEWIS, LUTHER HAMMOND. 160 Fifth Ave., New York City ..... April 6, 1904

LINDSEY, JOHN BROWN, Jr. Supt., West Pascagoula Creosoting Works, Gautier, Miss. ..... June 3, 1903

LION, LÉON ÉLIE. U. S. Junior Engr., Box 452, Monroe, La ..... { Jun. Feb. 1, 1898; Assoc. M. April 4, 1900

LIPSEY, THOMAS EUGENE LEARD. U. S. Junior Engr., Beaver, Pa. ..... April 6, 1904

LITTLE, GEORGE KERR. U. S. Asst. Engr., Tuscaloosa, Ala. ..... June 3, 1903

LIVERMORE, NORMAN BANKS. Civ. and Hydr. Engr., Rialto Bldg., San Francisco, Cal. ..... { Jun. Dec. 5, 1899; Assoc. M. Oct. 1, 1902

LLEWELLYN, FREDERICK THOMAS. Contracting Mgr., Am. Bridge Co. of N. Y., 100 Broadway, New York City ..... Oct. 4, 1899

LOCKE, WILLIAM WILLARD. San. Insp., Met. Water and Sewerage Board, 5 Myrtle St., South Framingham, Mass. ..... Oct. 6, 1897

LOCKWOOD, WILLARD DATUS. 64 Beverly St., Rochester, N. Y. ..... { Jun. April 3, 1894; Assoc. M. Oct. 7, 1896

LOGAN, WILLIAM SEELEY. Town Engr., Kearny; Address, 39 Midland Ave., Arlington, N. J. ..... April 6, 1904

LONG, EUGENE MCLEAN. 220 Broadway, New York City ..... June 1, 1898

LOOK, MOSES JEROME. Div. Engr., Met. Water and Sewerage Board, 98 Walnut St., Clinton, Mass. ..... May 6, 1903

LOVETT, GEORGE FREDERICK. Care, Finch, Pruyn & Co., Box 185, Glens Falls, N. Y. ..... Sept. 7, 1904

LOW, GEORGE EVARTS. 45 Broadway, New York City ..... { Jun. Nov. 6, 1894; Assoc. M. Mar. 2, 1898

LOWINSON, OSCAR. Cons. Archt., 33 West 42d St., New York City ..... { Jun. May 3, 1892; Assoc. M. Feb. 7, 1900

LUCAS, GEORGE LATIMORE. Res. Engr., Castlegould, Box 295, Port Washington, N. Y. ..... Dec. 7, 1904

LUDWIG, JULIUS ALFRED. 79 Wall St., New York City .... { Jun. May 31, 1892; Assoc. M. Oct. 2, 1895

LUND, GEORGE ALFRED. Box 388, Cape Town, South Africa ..... Nov. 7, 1894

LUND, ROBERT LEATHAN. Cons. Engr., Elk Bldg., Little Rock, Ark. . May 4, 1904

LYLE, WILLIAM THOMAS. Instr. in Civ. Eng., Univ. of Pennsylvania, Philadelphia, Pa. ..... Nov. 6, 1901

Date of Membership

LYNCH, TILLMAN DANIS. Engr. of Material Tests, Westinghouse Elec. & Mfg. Co., East Pittsburg, Pa ..... Nov. 3, 1897

LYON, WALLACE CHITTENDON. Asst. Structural Engr., Care, Superv. Archt.'s Office, Washington, D. C ..... Feb. 6, 1901

MACCRACKEN, GEORGE GERE. Asst. Engr., Interborough Rap. Trans. Co., 32 Park Pl., New York City ..... Jun. Feb. 5, 1901; Assoc. M. Feb. 3, 1904

MACCREA, DON ALEXANDER. 106 E. Main St., Berwick, Pa ..... Jun. May 2, 1899; Assoc. M. Oct. 1, 1902

MACDONALD, ARCHIBALD ANGUS. 111 Fifth Ave., New York City ..... Jun. June 4, 1901; Assoc. M. Oct. 5, 1904

MACGREGOR, JOHN GRANT. Chf. Engr.'s Office, Guelph & Goderich Ry., Goderich, Ont., Canada ..... June 3, 1903

MACGREGOR, ROBERT ATHOLE. Asst. Engr., Bureau of Highways, Third Ave. and 177th St., New York City ..... Nov. 2, 1898

MACHEN, HENRY BENNETT. Asst. Engr., Rapid Transit R. R. Comm. (Res., 315 West 95th St.), New York City. Jun. May 2, 1899; Assoc. M. Feb. 1, 1905

MACNAB, GEORGE TRAVILLA. Asst. Engr., Highways, Borough of Bronx, 106 West 130th St., New York City ..... Feb. 3, 1897

MACNAIR, HENRY JAMES. 144 Essex St., Boston, Mass ..... June 1, 1904

MACNEILLE, PERRY ROBINSON. 1703 Railway Exchange, Chicago, Ill ..... Jun. April 5, 1898; Assoc. M. June 5, 1901

MACOMB, JOHN DE NAVARRE, Jr. Res. Engr., The Eastern Oklahoma Ry., Lawrence, Kans ..... Oct. 5, 1904

MACY, ELBERT CLYDE. Prin. Asst. Engr., C. G. W. Ry., St. Paul, Minn. Sept. 2, 1903

MCCAFFERY, RICHARD STANISLAUS. Cons. Engr., 182 Broadway, New York City ..... Jun. May 4, 1897; Assoc. M. Sept. 4, 1901

MCCAUSTLAND, ELMER JAMES. Asst. Prof. of Min. and Surveying, Cornell Univ., Ithaca, N. Y ..... Sept. 5, 1900

MCCLURE, JOHN CLARENDON. Engr., M. of W., Gila Val., Globe & North. Ry., and Maricopa & Phoenix and Salt River Val. Ry., Tucson, Ariz ..... Feb. 6, 1895

MCCONNELL, IRA WELCH. Engr. in Chg., Uncompahgre Valley Project, U. S. Reclamation Service, Montrose, Colo ..... Dec. 7, 1904

MCCORMACK, EDGAR WALTER. Chf. Engr., Nipe Bay Co., Mayari, Cuba. Mar. 6, 1901

MCCOY, CHARLES EPHRAIM. Pittsburg, Pa ..... June 3, 1903

MCCREA, JAMES ALEXANDER. Supt., Cincinnati Div., Penn. Lines W. of Pitts., Cincinnati, Ohio ..... Jun. Nov. 1, 1898; Assoc. M. Nov. 7, 1900

MCCULLOCH, RICHARD. Asst. Gen. Mgr., United Rys. Co. of St. Louis, St. Louis, Mo ..... Mar. 2, 1898

MCCULLOCH, ROBERT AUSTEN. 51 Chambers St., New York City ..... Jun. Sept. 2, 1902; Assoc. M. Sept. 7, 1904

MCCURDY, HARRY SHERWOOD ROYDEN. Asst. Engr., Boston Transit Comm., 15 Beacon St., Boston, Mass ..... Sept. 7, 1904

MCDARGH, HARRY JOHN. Cons., Civ. and Hydr. Engr., Fifth Floor, Conover Bldg., Dayton, Ohio ..... April 2, 1902

MCFETRIDGE, WILLIAM SUTTON. Asst. Chf. Engr., Little Kanawha R. R., Greenville, Mercer Co., Pa ..... Jun. May 3, 1898; Assoc. M. Mar. 4, 1903

Date of Membership.

McGILVRAY, THOMAS FORRESTER. Cons. Engr., City Engr., City Hall, Duluth, Minn. — Feb. 5, 1902

McGUIRE, JAMES CLARK. Engr. and Contr., 26 Cortlandt St., New York City. — Jun. May 5, 1891; Assoc. M. Jan. 5, 1898

McKAY, GEORGE ALBERT. Civ. Engr., U. S. N., U. S. Naval Coal Depot, Narragansett Bay, Newport, R. I. — Feb. 4, 1903

McKENNEY, CHARLES ALBERT. Asst. Engr., Municipal Bldg. (Res., 1502 Seventeenth St., N. W.), Washington, D. C. — Jun. Dec. 4, 1894; Assoc. M. Dec. 1, 1897

McKENZIE, THOMAS. Engr. and Supt., Westerly Water-Works, Westerly, R. I. — Jun. May 2, 1893; Assoc. M. Nov. 6, 1895

McKIBBEN, FRANK PAPE. Asst. Prof. of Civ. Eng., Mass. Inst. Tech., Boston, Mass. — Jun. Jan. 3, 1895; Assoc. M. Mar. 6, 1901

McLEAN, JOSEPH PATTON. Room 9, City Hall, Jersey City, N. J. — Mar. 2, 1904

McMEEKIN, CHARLES WILLIAM. Vice-Pres. of The Britannia Copper Syndicate, Ltd., Vancouver, B. C., Canada. — Jun. April 2, 1890; Assoc. M. Mar. 7, 1894

McPHERSON, ROBERT HENRY. With Robins Conveying Belt Co., Park Row Bldg., New York City. — Jan. 4, 1905

McREYNOLDS, ORVAL OMAR. Civ. and Min. Engr. (Middleton & McReynolds), 709 Equitable Bldg., Denver, Colo. — Dec. 5, 1900

MADDEN, JOHN HENRY. Asst. Engr., Rapid Transit R. R. Comm., 308 West 30th St., New York City. — Jun. Oct. 7, 1902; Assoc. M. May 4, 1904

MAGOR, HENRY BASIL. Pres., Wonham-Magor Eng. Works, 29 Broadway, New York City. — Jun. April 30, 1895; Assoc. M. Mar. 7, 1900

MALUKOFF, ALEXIS JOSEPH. With the Rapid Transit R. R. Comm., 320 Broadway (Res., 213 West 136th St.), New York City. — Jan. 2, 1901

MANAHAN, ELMER GOVE. Engr. for Myles Tierney, Oradell, N. J. — Oct. 7, 1903

MANNING, ROLLO GLENROY. Engr., Toledo Plant, Am. Bridge Co., 1303 Utah St., Toledo, Ohio. — Oct. 2, 1901

MANTER, RALPH BARTON. Care, Isthmian Canal Comm., Gatun, Canal Zone, Panama. — June 1, 1904

MARDEN, WALTER REUBEN. Vice-Pres. and Chf. Engr., The United Constr. Co., 467 Broadway, Albany, N. Y. — April 4, 1894

MARQUAND, PHILIP. Allen, Sand & Co., Bankers, 44 Pine St., New York City. — Oct. 5, 1898

MARSTON, FRANK LEONARD. 49 Hammond St., Bangor, Me. — Oct. 2, 1901

MARTIN, JAMES WILLIAM. Engr. for Denver & Pueblo Constr. Co., 318 Fourteenth St., Denver, Colo. — Nov. 1, 1899

MASON, FRANCIS. Asst. Engr., Penn., N. Y. & L. I. R. R., 345 East 33d St., New York City. — Jun. April 3, 1900; Assoc. M. April 1, 1903

MASON, GEORGE COTNER. Engr. and Contr., 412 Fenton Bldg., Portland, Ore. — Jun. Mar. 6, 1894; Assoc. M. May 3, 1899

MATHESON, ERNEST GEORGE. 64 West 104th St., New York City. — June 1, 1904

MATTAIR, LEWIS HENRY. Civ. and San. Engr., Quartermaster Dept., U. S. A., Fort McPherson, Ga. — Oct. 1, 1902

MATTHES, FRANCOIS EMILE. Topographer, U. S. Geological Survey, Washington, D. C. — April 3, 1901

Date of Membership.

MAXIMOFF, SERGIUS PAVLOVITCH. Engr. to the Imperial Russian Govt.; Asst. at the Imperial Inst. of Public Ways at St. Petersburg, Zabalkanski pr. 67, St. Petersburg, Russia..... April 1, 1903

MAYER, AUGUST. 810 Jordan St., Shreveport, La..... June 1, 1892

MEEM, JAMES COWAN. Chf. Engr. for Cranford & McNamee, 52 Ninth St. (Res., 177 Woodruff Ave.), Brooklyn, N. Y. ..... April 1, 1896

MERRILL, OGDEN. 78 South 10th St., Brooklyn, N. Y..... Feb. 3, 1904

MESA, ANTONIO ESTEBAN. Animas 100, Havana, Cuba ..... Jan. 1, 1896

MILES, JOHN WILEY. Tehuantepec National Ry., Rincon Antonio, Oaxaca, Mexico..... Oct. 2, 1901

MILLARD, CHARLES STERLING. Engr., M. of W., Peoria & Eastern Ry., Indianapolis, Ind..... Jun. May 2, 1899; Assoc. M. June 5, 1901

MILLER, CLIFFORD NEVILLE. Asst. Engr. in Chg. of Chf. Engr.'s Office, Board of Trustees, Commrs. of Water-Works (Res., 25 San Rafael Bldg.), Cincinnati, Ohio. Jun. June 4, 1891; Assoc. M. Feb. 5, 1896

MILLER, GEORGE SOTER. Supt., Engr. Dept., Fort H. G. Wright, Fishers Island, N. Y..... April 1, 1903

MILLER, HEW. 150 West 35th St., New York City..... Mar. 3, 1897

MILLS, JOHN CHARLES. Care, Messrs. King, Hamilton & Co., Calcutta, India..... Nov. 6, 1895

MOISSEIFF, LEON SOLOMON. Asst. Engr., Dept. of Bridges, Room 1235, Park Row Bldg., New York City..... Jun. Dec. 3, 1895; Assoc. M. Sept. 5, 1900

MOLER, WILLIAM GRIFFITH. Representative of Am. Mfrs. for the Republic of Mexico, Apartado 289, City of Mexico, Mexico..... Jan. 3, 1900

MONCURE, WILLIAM AUGUSTUS. R. of W. Agt., P. R. R., Broad St. Station, Philadelphia, Pa..... Jun. June 21, 1894; Assoc. M. Oct. 7, 1896

MONSARRAT, NICHOLAS DAUBENEY. Chf. Engr., Sunday Creek Coal Co., 432 E. Broad St., Columbus, Ohio. Jun. Feb. 5, 1895; Assoc. M. Sept. 2, 1903

R. MONTONY, LIBERTY GILBERT. 128 Twelfth St., Troy, N. Y..... Jun. May 3, 1892; Assoc. M. Feb. 5, 1896

MOORE, CHARLES GILLINGHAM. City Engr., Coldwater, Mich..... Mar. 5, 1902

MOORE, WALTER SOTHORON. Supt., Cent. Ind. Ry. Co., Anderson, Ind. Mar. 7, 1900

MOREY, RICHARD. Pres., Morey Eng. & Constr. Co., Equitable Bldg., St. Louis, Mo..... Jan. 2, 1901

MORISON, WILLIAM SMITH. 1515 Franklin St., Wilmington, Del ..... April 6, 1904

MORITZ, CHARLES HOLLAND. Supt., Northern Aluminum Co., Shawinigan Falls, Que., Canada ..... Oct. 2, 1901

MORRISON, EUGENE TAYLOR. Asst. Engr., Bridge and Constr. Dept., Penn. Steel Co., Steelton, Pa ..... Jan. 2, 1901

MORRISON, HARRY JOHNSON. Div. Engr., Met. Water and Sewerage Board, 25 Leighton Ave., Clinton, Mass..... Jan. 4, 1899

MOSES, PERCIVAL ROBERT. Cons. Engr., 35 Nassau St., New York City. Oct. 3, 1900

MOSS, CASTLE PRENTICE. 1714 Jefferson St., Kansas City, Mo..... June 3, 1903

MOSS, ROBERT EDWARD. Structural Engr., 12 Elm St., New York City. Mar. 2, 1900

MOTT, WILLIAM ELTON. Asst. Prof. of Hydr. Eng., Cornell Univ., Ithaca, N. Y ..... Mar. 5, 1902

MUNROE, HERSEY. Topographer, U. S. Geological Survey, Washington, D. C..... Mar. 5, 1902

Date of Membership.

MURPHY, EDWARD CHARLES. Engr., U. S. Geological Survey, 82 V St., Washington, D. C. — Sept. 5, 1900

MURPHY, JOSEPH EDGAR. Engr., M. of W., Galesburg Div., C., B. & Q. Ry., Galesburg, Ill. — Sept. 2, 1903

MURRAY, CHARLES WARREN. City Engr. and Supt. of Water-Works, City Hall Bldg., Americus, Ga. — Dec. 2, 1903

MYERS, EDWARD WARREN. Engr., Reclamation Service, U. S. Geological Survey, Carlsbad, N. Mex. — Oct. 2, 1901

MYERS, JOHN HAYS. Senior Asst. Engr., 2d Div., N. Y. Rapid Transit Comm., 1947 Broadway, New York City.... — Jun. Dec. 5, 1893; Assoc. M. Oct. 5, 1898

NAGLE, JAMES C. Prof. of Civ. Eng., Agri. and Mech. Coll. of Texas, College Station, Tex. — April 5, 1899

NEFF, FRANK HOWARD. Prof. of Civ. Eng., Case School of Applied Science; Address, 1975 Doan St., Cleveland, Ohio. — May 6, 1903

NELSON, WILLIAM. Of Firm of H. Bickford & Co., Lakeport, N. H... — June 6, 1900

NEUMEYER, ROBERT ENGLER. Borough Engr. of the Towns of Bethlehem and South Bethlehem, 207 Broad St., Bethlehem, Pa. — Jun. May 31, 1892; Assoc. M. Mar. 3, 1897

NEVILLE, COLONE WILL JACKSON. Southern Mgr., Gen. Eng. Co., 404 Hennen Bldg., New Orleans, La.... — Jun. Oct. 1, 1901; Assoc. M. June 3, 1903

NEWBERRY, SPENCER BAIRD. Gen. Mgr., Sandusky Portland Cement Co., Sandusky, Ohio. — Jan. 6, 1897

NEWTON, RALPH EELLS. Cons. Engr., Newton Eng. Co., Milwaukee, Wis. — Jan. 8, 1902

NICHOLS, CHARLES HENRY. Cons. Engr., and Engr. of Connecticut Shell Fish Comm., New Haven, Conn .... — Jun. May 2, 1893; Assoc. M. May 2, 1900

NICHOLS, CLARENCE HICKS. 36 West 37th St., New York City ..... — April 6, 1904

NICHOLS, HENRY FRANCIS. Gen. Mgr. and Engr., James Hill & Sons, 63 Grenfell St., Adelaide, South Australia. — Oct. 1, 1902

NOBLE, CLARENCE WARREN. Structural Engr. with Builders' Material Supply Co., 405 Brooklyn Ave., Kansas City, Mo. — Feb. 3, 1904

NOBLE, FREDERICK CHARLES. Asst. Engr., Rapid Transit Comm., 4 Court Sq., Brooklyn, N. Y. — June 4, 1902

NOBLE, WALTER EDWIN. City Hall, Fall River, Mass. — April 2, 1902

NOSKA, GEORGE ALBERT. 33 East 17th St., New York City. — Jun. Mar. 31, 1896; Assoc. M. Sept. 3, 1902

OAKES, LUTHER STEVENS. Asst. Engr., N. P. Ry. Co., Pier 2, Seattle, Wash. — Jan. 4, 1905

O'BRIEN, JOSEPH HENRY. Engr., Westinghouse, Church, Kerr & Co., 10 Bridge St., New York City ..... — May 1, 1901

OESTREICH, HENRY LEWIS, Jr. Asst. Engr., Rapid Transit Comm., 13 Astor Pl. (Res., 2092 Bathgate Ave.), New York City..... — Jun. Oct. 4, 1892; Assoc. M. Dec. 6, 1899

OGDEN, HENRY NEELY. Prof. of San. Eng., Cornell Univ., Ithaca, N. Y. — Jun. Oct. 3, 1893; Assoc. M. Oct. 5, 1898

OLBERG, CHARLES REAL. Asst. Engr., U. S. Geological Survey, Washington, D. C. — May 7, 1902

Date of Membership.

OLDS, CLARK. Erie, Pa. — Mar. 1, 1899

OMBERG, JAMES ADOLPHUS, Jr. City Engr., Memphis, Tenn. — April 1, 1903

OPDYCKE, HENRY GORTON. Park Row Bldg., New York City. — Sept. 7, 1904

ORR, ALEXANDER. Supt., Water-Works, Gloversville, N. Y. — Jun. June 4, 1901; Assoc. M. Feb. 5, 1902

OSBORN, OLLIE STEELE. Asst. Chf. Engr., C., B. & C. R. R., Bluffton, Ind. — Oct. 2, 1901

OSBORNE, GEORGE FREDERICK FOLGER. Lieut., Royal Engrs.; Asst. Engr., Public Works Dept. (Rys.), Govt. of India; Address, King, King & Co., Fort, Bombay, India. — Dec. 7, 1904

OSBOURN, HENRY VAN BUREN. 1433 Euclid Ave., Philadelphia, Pa. — Sept. 3, 1902

OSTRANDER, JOHN EDWIN. Prof. of Math. and Civ. Eng., Mass. Agri. Coll., Amherst, Mass. — Jun. May 2, 1888; Assoc. M. Sept. 2, 1891

PAINE, HIBBARD ATWILL. Stigler, Ind. T. — Feb. 4, 1903

PAQUETTE, CHARLES ALFRED. Supt., C., C., C. & St. L. Ry., Indianapolis, Ind. — April 6, 1898

PARKER, CHARLES FREDERIC. Supt. of Socavon Mines, Cia. Minera de Peñoles, La Ojuela, Mapimi, Durango, Mexico. — Jun. June 5, 1900; Assoc. M. Sept. 2, 1903

PARSONS, ARCHIBALD LIVINGSTONE. Civ. Engr., U. S. N., Cavite, Philippine Islands. — May 7, 1902

PARSONS, CHARLES EDWARD. Chf. Engr., Hudson River Water Power Co., Glens Falls, N. Y. — May 6, 1903

PATCH, WALTER WOODBURY. Asst. Engr., Aqueduct Comm., Jerome Park Reservoir, Kingsbridge, New York City. — Sept. 7, 1904

PATERSON, HARRY THOMAS. Asst. Engr., U. S. Geological Survey, Reclamation Service, Leetville, Nev. — Feb. 3, 1904

PECK, JOHN GATES. Bridge Designer, Office of State Engr. (Res., 483 Hamilton St.), Albany, N. Y. — Sept. 3, 1902

PEMOFF, JOEL JUK. Asst. Engr., Dept. of Docks and Ferries, in Chg. of the Chelsea Section, Pier A, North River, New York City. — Nov. 5, 1902

PERKINS, PHILO SACKETT. Asst. Engr., N. Y., N. H. & H. R. R., 59 Chester Ave., Providence, R. I. — Jun. Mar. 5, 1890; Assoc. M. April 3, 1895

PETTEE, EUGENE EVERETT. 1107 Exchange Bldg., Boston, Mass. — Sept. 3, 1902

PFAU, JULIUS WELCH. Masonry Expert, Barge Canal Office, Albany (Res., 510 Second Ave., Troy), N. Y. — Dec. 2, 1903

PFEIFER, HERMAN JULIUS. Gen. Supt. of Street Constr., 2145 Blendon Pl., St. Louis, Mo. — Sept. 6, 1899

PFEIFFER, GEORGE WHITFIELD. Supt., Spanish-American Iron Co., Daiquiri, Cuba. — Oct. 5, 1904

PHARR, HARRY NELSON. Chf. Engr., St. Francis Levee Dist., 168 Randolph Bldg., Memphis, Tenn. — Oct. 3, 1900

PHILLIPS, FREDERICK CLINTON. Res. Engr., Bridge St. Viaduct, Jacksonville, Fla. — Jun. June 4, 1895; Assoc. M. April 4, 1900

PHILLIPS, HOWARD CRATHORNE. Chf. Engr., San Fran. & N. W. Ry., Crossley Bldg., San Francisco, Cal. — Jun. April 5, 1892; Assoc. M. Sept. 6, 1899

Date of Membership.

PHILLIPS, THEODORE CLIFFORD. Civ. and Hydr. Engr., Room I, Floor 21, St. Paul Bldg., New York City ..... Mar. 2, 1904

PIERCE, JAMES WILSON. Care, R. L. Fosburg & Sons, Gen. Contrs., Board of Trade Bldg., Boston, Mass ..... Feb. 3, 1904

PILLSBURY, GEORGE BIGELOW. 1st Lieut., Corps of Engrs., Washington Barracks, Washington, D. C ..... Dec. 7, 1904

PINCOMBE, WILLIAM EDWIN. East Indian Ry., Calcutta, India ..... Feb. 4, 1903

PITTS, THOMAS DORSEY. 45 Broadway, New York City .. { Jun. Dec. 7, 1897 / Assoc. M. June 4, 1902

POLLOCK, CLARENCE DUBOIS. Asst. Engr., Bureau of Highways, Municipal Bldg., Brooklyn, N. Y ..... Jan. 8, 1902

PORTER, JAMES MADISON. Prof., Civ. Eng., Lafayette Coll., Easton, Pa. May 4, 1892

POST, WILLIAM SCHUYLER. 1209 Braly Bldg., Los Angeles, Cal ..... May 1, 1901

POTTER, ALEXANDER. Cons. Civ. Engr., 143 Liberty St., { Jun. Jan. 4, 1888
New York City ..... { Assoc. M. Jan. 6, 1892

PRESSEY, HENRY ALBERT. 1416 F St., Washington, D. C ..... May 1, 1901

PRESTON, HENRY WRAY. Engr., Elmira Plant, Empire Bridge Co., Elmira, N. Y ..... May 3, 1899

PRINCE, ARTHUR DICKSON. Asst. Engr., Rapid Transit { Jun. May 5, 1896
Comm., 13 Astor Pl., New York City ..... { Assoc. M. Oct. 3, 1900

PRITCHARD, CLIFFORD MOSES. Asst. Engr., The Mo. Val. Bridge & Iron Works, 19th and Cherokee Sts., Leavenworth, Kans ..... April 1, 1903

PRITCHARD, PHILIP MORRIS. Chf. Engr.'s Office, The United Alkali Co., Ltd., Widnes, Lancashire, England ..... June 6, 1900

PRITCHETT, CHARLES MARCELLUS. R. F. D., Cliff Cottage, Toney Creek, S. C ..... Sept. 2, 1903

PROUTY, EDWARD NATHAN. Asst. Prof., R. R. Eng., Univ. of California, Berkeley, Cal ..... Feb. 3, 1904

PRUYN, FRANCIS LANSING. Treas., The United Eng. & { Jun. Dec. 1, 1896
Contr. Co., 13 Park Row, New York City ..... { Assoc. M. June 7, 1899

PUGH, MARSHALL ROGERS. Civ. and Cons. Engr., Room 1334, Real Estate Trust Bldg., Philadelphia, Pa ..... Dec. 7, 1904

QUICK, ALFRED MERRITT. Pres. of Water Board and Water Engr., City Hall, Baltimore, Md ..... Oct. 5, 1898

RACE, JOHN MARBLE. Housatonic, Mass ..... Mar. 5, 1902

RAINBOW, JOHN ROWORTH. Archt., 3 East 33d St., New York City .... Jan. 6, 1904

RAMSEY, EDMUND PAYTON. Asst. Engr., Office of Pres., { Jun. Feb. 6, 1900
Borough of Queens, New York City (Res., 826 Marcy Ave., Brooklyn, N. Y.) ..... { Assoc. M. Oct. 1, 1902

RAMSEY, GUY ROBERT. Civ. Engr. for T. C. I. & R. R. Co., Box 5, Ensley, Ala ..... Oct. 7, 1903

RAYNOR, CLARENCE WEBSTER. The Western Eng. Co. { Jun. Feb. 4, 1902
(Hahn, Barr & Raynor, Proprs.), 407 Jackson Bldg., { Assoc. M. April 6, 1904
Denver, Colo ..... {

Date of Membership.

Reaburn, De Witt Lee. Topographer, U. S. and Canada Boundary Survey, Washington, D. C. ..... April 6, 1904

Reid, Homer Austin. Examining Engr., Comm. of Accounts, 280 Broadway (Res., 120 West 123d St.), New York City ..... Dec. 4, 1901

Reynolds, Justin Oakley. Asst. Engr., Rapid Transit R. R. Comm., 2041 Washington Ave., Bronx, New York City ..... Jun. Oct. 6, 1896; Assoc. M. Dec. 5, 1900

Rhines, George Volney. Structural Designer, with Geo. S. Mills, Archt., 505 Gardner Bldg., Toledo, Ohio ..... June 3, 1903

Rhodes, Fred Dana. Structural Engr., 51 Chambers St., New York City ..... Jun. June 6, 1899; Assoc. M. Nov. 6, 1901

Rhys-Roberts, Edmund Alyth. Dominion Bridge Co., Ltd., Lachine Locks, Que., Canada ..... Nov. 3, 1897

Rickey, James Walter. Engr., St. Anthony Falls Water Power Co., Minneapolis, Minn ..... Sept. 3, 1902

Riegler, Louis John. Engr., Penn. Co., 417 Third St., Allegheny, Pa ..... Sept. 3, 1902

Rights, Lewis Daniel. Contr. Engr., Lewis F. Shoemaker & Co., 902 Chapel St., New Haven, Conn ..... Mar. 5, 1902

Ripley, Theron Monroe. Marietta, Ohio ..... Nov. 6, 1901

Rittenhouse, Harvey. Engr., M. of W., C. & P. R. R., Box 604, Cumberland, Md ..... Jun. April 4, 1893; Assoc. M. Dec. 7, 1898

Robb, Louis Adams. 71 Lincoln Park, Newark, N. J. ..... Jun. May 5, 1903; Assoc. M. Oct. 5, 1904

Roberts, George Thomas. Contr., 401 D. S. Morgan Bldg., Buffalo, N. Y. ..... Sept. 3, 1902

Roberts, William Jackson. Assoc. Prof. of Math. and Civ. Eng., Wash. Agri. Coll. and School of Science, Pullman, Wash. ..... June 6, 1900

Robertson, Marshall Pope. Mem., State Board of Engrs. of La., 225 Carondelet St., New Orleans, La ..... Mar. 5, 1902

Robinson, Harry Hayes. Asst. Engr., Maine Cent. R. R., Portland, Me. May 4, 1904

Robinson, Holton Duncan. Asst. Engr., Dept. of Bridges, Park Row Bldg. (Res., 357 West 121st St.), New York City ..... Jun. Mar. 1, 1893; Assoc. M. Jan. 3, 1894

Rockenbach, Samuel Dickerson. Capt., 12th U. S. Cavalry, Manila, Philippine Islands ..... Feb. 6, 1901

Rockwell, James Vincent. Civ. Engr., U. S. N., U. S. Naval Station, San Juan, Porto Rico ..... Jun. April 3, 1900; Assoc. M. Feb. 4, 1903

Rommel, George, Jr. Chf. Engr., Street and Sewer Dept., S. W. cor. 6th and King Sts., Wilmington, Del ..... Jun. Jan. 3, 1899; Assoc. M. Mar. 5, 1902

Rosenberg, Friedrich. Civ. Engr. and Contr., 361 Claremont Ave., Montclair, N. J ..... Jun. Oct. 2, 1889; Assoc. M. Jan. 6, 1892

Rosenthal, Albert. Supt., Westchester Lighting Co.; Vice-Pres., Pelham Bay Chemical Co., Mt. Vernon, N. Y. Jun. Jan. 2, 1894; Assoc. M. Nov. 6, 1901

Rosewater, William Marcus. With Heyl & Patterson, Contr. Engrs., Pittsburg, Pa ..... June 5, 1901

Ross, Elmer Wayland. Asst. Engr., Bridge Dept., City Engr.'s Office, Providence, R. I ..... Jun. Mar. 5, 1890; Assoc. M. June 1, 1892

Date of Membership.

ROSS, THOMAS ALEXANDER. Locating Engr., Shanghai Nanking Ry., Chinkiang, China ..... Dec. 3, 1902

ROUNDEY, EUGENE PERONNEAU. Asst. Engr., Cleveland Elec. Ry., Cleveland, Ohio ..... Jan. 6, 1904

ROUSSEAU, HARRY HARWOOD. Civ. Engr., U. S. N., Mare Island Navy Yard, Cal ..... Jun. June 6, 1893; Assoc. M. April 4, 1900

ROWELL, GEORGE FREEMAN. Asst. Engr., Susquehanna Canal & Power Co., Conowingo, Md. ..... Jun. May 4, 1897; Assoc. M. Jan. 2, 1901

ROY, ROBERT MAITLAND. Asst. to Vice-Pres. and Mgr., The Hamilton Bridge Works Co., Ltd., Hamilton, Ont., Canada ..... Oct. 3, 1900

RUGGLES, CHARLES ARNER. Mgr., Columbian Fireproofing Co., 26 West 26th St., New York City ..... June 4, 1902

RUNYON, WILLIAM KERPER. Care, Pan American Co., San Geronimo, Tantima, Vera Cruz, Mexico ..... Jun. April 5, 1898; Assoc. M. Oct. 5, 1904

RUSSELL, RICHARD LORD. Prin. Asst. Engr., Brighton Beach R. R. Impvt., 44 Court St., Brooklyn, N. Y. Jun. Feb. 5, 1895; Assoc. M. April 3, 1901

SABIN, ALVAH HORTON. Box 85, Long Island City, N. Y. ..... Mar. 4, 1896

SABINE, EDWARD DANA. Chf. Engr., Am. Pneumatic Service Co., 167 South Canal St., Chicago, Ill ..... Feb. 5, 1902

SANBORN, JAMES FORREST. 1 St. Felix St., Brooklyn, N. Y. ..... May 4, 1904

SANDERS, FRANCIS NICOLL. 235 State St., Albany, N. Y. ..... Sept. 3, 1902

SANFORD, HARRY CHARLES. Engr., Degnon Contr. Co., 13 Park Row, New York City ..... Oct. 5, 1898

SARGENT, JOSEPH ANDREWS. Engr., U. S. Reclamation Service, Montrose, Colo. ..... Oct. 2, 1901

SCAMMELL, JOHN KIMBALL. Asst. Engr., Public Works, Canada, Box 321, Saint John, N. B., Canada ..... June 4, 1902

SCHAEFFER, AMOS. Asst. Engr., Rapid Transit R. R. Comm., 408 West 150th St., New York City ..... Feb. 3, 1904

SCHARSCHMIDT, SAMUEL HOWARD. Prin. Engr., United Fruit Co., Bocas-del-Toro, Panama ..... May 1, 1901

SCHENK, CARL LOUIS EDUARD. Contr. Engr., Steam Engines and Mine Equipments, 308 House Bldg., Pittsburg, Pa. ..... Oct. 1, 1902

SCHEUERMANN, HUGO JULIUS. Bridge Designer, Barge Canal Office, Albany, N. Y. ..... Dec. 7, 1904

SCHMITT, EWALD. Asst. Engr., Reconstruction, Washington Barracks, 311 Florida Ave., N. W., Washington, D. C. ..... Feb. 7, 1900

SCHMITZ, FRANK CURTISS. Gen. Mgr., Columbian Fireproofing Co., 26 West 26th St., New York City ..... Dec. 6, 1899

SCHNEIDER, ANTON. Care, Alphons Custodis Chimney Constr. Co., Pittsburg, Kans. ..... May 4, 1898

SCHNEIDER, HERMAN. Prof. of Civ. Eng., Univ. of Cincinnati, Cincinnati, Ohio ..... April 2, 1902

SCHWIERS, FREDERICK WILLIAM. Contr. Engr., 208 West 104th St., New York City ..... Jun. June 5, 1900; Assoc. M. Jan. 7, 1903

SCOFIELD, EDSON MASON. Pres. and Chf. Engr., The Scofield Co.; Cons. and Contr. Engrs., Pennsylvania Bldg., Philadelphia, Pa. April 1, 1896

	Date of Membership.
Scott, Charles Bruce. Engr. of The Beacon Coal & Coke Co., Davis, W. Va.	Feb. 3, 1904
Sears, Robert Humphry. Engr. in Chg., Ondal Sainthia Ry., Raneeganj E. I. R., Bengal, India.	Dec. 4, 1901
Sears, Thomas Bartlett. Lawrence, Kans.	Oct. 5, 1904
Seaton, William, Jr. Care, C. W. Hunt Co., 45 Broadway, New York City.	June 4, 1902
Seltzer, Harry Kent. 608 New Nelson Bldg., Kansas City, Mo.	Jun. Feb. 4, 1896 Assoc. M. Jan. 2, 1901
Senior, Samuel Palmer. Engr. and Supt., Bridgeport Hydr. Co., 323 Water St., Bridgeport, Conn.	Oct. 7, 1903
Sesser, John Cornelious. Centralia, Ill.	Jun. Sept. 5, 1899 Assoc. M. April 1, 1903
Shaner, Harry Linden. Lynchburg, Va.	Dec. 7, 1904
Shannahan, John Newton. Gen. Supt., F. J. & G. R. R., Gloversville, N. Y.	Jun. Oct. 4, 1898 Assoc. M. Mar. 6, 1901
Shaw, Enos Larkin. 2667 N. Ashland Ave., Chicago, Ill.	Jun. Oct. 3, 1893 Assoc. M. June 1, 1898
Shellenberger, Leidy Rudy. 204 West 44th St., New York City.	May 2, 1900
Shepardson, John Eaton. Shabbona Grove, DeKalb Co., Ill.	Jan. 7, 1903
Shepherd, Frank Cummings. Res. Engr., Manhattan Dist., Terminal Engr.'s Office, N. Y. C. & H. R. R. R., Grand Central Palace, New York City.	Oct. 5, 1904
Shertzer, Tyrrell Bradbury. Asst. Engr., Rapid Transit R. R. Comm., 621 West 152d St., New York City.	Oct. 5, 1904
Shima, Takejiro. Am. Bridge Co., 7 West 22d St., New York City.	Mar. 4, 1903
Shire, Moses Edmund. Engr. in Chg., Chicago Union Transfer Ry. Co., 1618 Tribune Bldg., Chicago, Ill.	Jun. April 2, 1901 Assoc. M. Jan. 4, 1905
Shoemaker, Louis Henry. Engr. in Chg., Bridge Design, Pittsburg Dist., Am. Bridge Co., 802 Frick Bldg., Pittsburg, Pa.	Oct. 4, 1899
Shoemaker, Marshall Ney. Vice-Pres., Am. Concrete-Steel Co., Prudential Bldg., Newark, N. J.	April 1, 1903
Short, William Ambrose Dudley. Supt., Signals, C., N. O. & T. P. Ry. (Res., 200 Market St.), Lexington, Ky.	Feb. 5, 1902
Sickman, Albert Franklin. Hydr. Engr., Holyoke Water Power Co., Holyoke, Mass.	Mar. 4, 1903
Simpson, Erastus Roland. Engr. and Gen. Mgr., Mech. Dept., Chapman Double Ball Bearing Co., Ltd., 39 Pearl St., Toronto, Ont., Canada.	Nov. 4, 1903
Simpson, George. Chf. Engr. of the Thompson-Starrett Co., 51 Wall St., New York City.	April 4, 1900
Skelly, James William. Junior Engr., U. S. Engr. Office, Custom House, St. Louis, Mo.	Jun. May 2, 1899 Assoc. M. April 1, 1903
Slayton, Charles Albert. St. L., Brownsville & Mex. Ry., Corpus Christi, Tex.	April 2, 1902
Smith, Albert. Saltsburg, Pa.	Jan. 6, 1892
Smith, Albert Henry. Asst. Mech. Engr., Am. Bridge Co., 1309 Utah St., Toledo, Ohio.	Oct. 2, 1901

Date of Membership.

SMITH, CHESTER WASON. Const. Engr. Reclamation Service, U. S. Geological Survey, Roosevelt, Ariz. ..... Oct. 5, 1904

SMITH, EDGAR MAVERICK. Engr., Railway Appliances Co., 1175 Old Colony Bldg., Chicago, Ill ..... Dec. 2, 1903

SMITH, LEONARD SEWALL. Asst. Prof., Topographic and Geodetic Eng., Univ. of Wisconsin, 939 University Ave., Madison, Wis.. June 2, 1897

SMITH, LLOYD BOWN. Engr., Topeka Bridge & Iron Mfg. Co., Topeka, Kans ..... April 6, 1904

SMITH, PEMBERTON. South American Representative, U. S. Steel Products Export Co., Buenos Aires, Argentine Republic ..... Jun. Mar. 31, 1891; Assoc. M. April 4, 1894

SMITH, WALTER MICKLE. U. S. Asst. Engr., U. S. Engr. Office, Charleston, S. C ..... Oct. 2, 1901

SMITH, WILLIAM STUART. New York State Mgr., Warren Bros. Co., 149 Main St., West, Rochester, N. Y. ..... Jan. 8, 1902

SMITH, WILSON FITCH. Asst. Engr., Rapid Transit R. R. Comm. (Res., 36 West 36th St.), New York City.... Jun. Jan. 3, 1895; Assoc. M. May 1, 1901

SNYDER, FREDERIC ANTES. Secy., Commonwealth Water & Light Co., Summit, N. J ..... June 1, 1904

SOPER, GEORGE ALBERT. Cons. Engr. and San. Expert, 29 Broadway, New York City ..... Feb. 6, 1901

SPEAR, WALTER EVANS. With John R. Freeman, Cons. Engr., 814 Banigan Bldg., Providence, R. I. ..... Feb. 3, 1904

SPENCER, THEODORE NELSON. Asst. Engr. in Chg. of Torresdale Conduit, Impvt., Extension and Filtration of the Water Supply, City of Philadelphia, 1821 Mt. Vernon St., Philadelphia, Pa.... Sept. 5, 1900

SPENCER, WALTER TUTTLE. Div. Engr., N. Y., N. H. & H. R. R., New Haven, Conn ..... Jun. May 2, 1893; Assoc. M. Oct. 4, 1899

SPIELMAN, JOHN GODFREY. 50 Wabansia Ave., Chicago (Res., 2359 N. Hermitage Ave., Ravenswood), Ill... Jun. Mar. 4, 1891; Assoc. M. May 1, 1895

SPOFFORD, CHARLES MILTON. Asst. Prof. of Civ. Eng., Mass. Inst. Tech., Boston, Mass ..... June 4, 1902

STAYTON, EDWARD MOSES. 423 East Kansas St., Independence, Mo... Feb. 4, 1903

STEARNS, EDWARD BURNHAM. Contr. Mgr., Am. Bridge Co. of N. Y., 89 State St., Boston, Mass ..... June 1, 1898

STEARNS, FRED LINCOLN. Dist. Supt. of Street Cleaning, 52 West 126th St., New York City ..... Assoc. June 3, 1902; Assoc. M. Jan. 31, 1905

STEFFENS, WILLIAM FREDERICK. Asst. Engr. (Bridges and Bldgs.), M. of W. Dept., N. Y. C. & H. R. R. R., 5 Vanderbilt Ave., New York City ..... Jun. April 3, 1900; Assoc. M. Oct. 1, 1902

STEHLE, FELIX CHARLES. With Empire Bridge Co. at Brooklyn Plant; Address, 50 East 112th St., New York City ..... June 3, 1903

STENGER, ERNEST. Asst. Supt., U. P. R. R., Cheyenne, Wyo..... June 5, 1895

STEVENS, ALEXANDER. Supt. of Bldgs., N. Y. Fire Dept., 157 East 67th St., New York City ..... April 1, 1896

STEVENS, PERLEY EGBERT. 497 Carroll St., St. Paul, Minn ..... Jun. April 6, 1897; Assoc. M. April 2, 1902

Date of Membership.

STEVENSON, WILLIAM FREEMAN. 708 St. Nicholas Ave., New York City ..... Oct. 5, 1904

STEWART, CLINTON BROWN. Instr. in Mechanics, Univ. of Wisconsin, Madison, Wis ..... Oct. 5, 1898

STICKNEY, GEORGE FETTER. U. S. Asst. Engr., 316 West 84th St., New York City ..... Jun. May 1, 1894; Assoc. M. April 5, 1899

STIDHAM, HARRISON. Supt., Dept. of Street Cleaning, District Bldg., Washington, D. C ..... April 4, 1900

STOCKETT, ALFRED WALTON. Gen. Mgr., The West Roodepoort Deep Gold Min. Co., P. O. Box 6051, Johannesburg, Transvaal, South Africa ..... Jan. 1, 1896

STOWE, HAROLD CLAIR. Contr. Engr. (Clarke & Stowe), 232 Kent St., Brooklyn, N. Y ..... April 7, 1897

STRAHAN, CHARLES MORTON. Univ. of Ga., Athens, Ga ..... June 1, 1898

STRATTON, GEORGE DRAPER. Asst. Engr., Western Div., S. P. Co., 946 Chestnut St., Oakland, Cal ..... Oct. 4, 1899

STRATTON, GEORGE EBER. Asst. Engr., U. S. Geological Survey, Washington, D. C ..... Jan. 8, 1902

STRAWN, THOMAS CORWIN. Box 374, Lynchburg, Va ..... Jun. Nov. 5, 1901; Assoc. M. June 3, 1903

STRONG, JAMES BOORMAN. Engr., Ramapo Iron Works, Hillburn, Rockland Co., N. Y ..... Oct. 5, 1904

STRONG, WILLIAM EDWARD SCHENCK. Mgr. of Eng. Dept., Care, Am. Radiator Co., Chicago, Ill ..... April 6, 1898

STUART, JAMES LYALL. 1202 Westinghouse Bldg., Pittsburg, Pa ..... Jun. Oct. 4, 1898; Assoc. M. Feb. 7, 1900

SUMNER, ROBERT SWAN. Chf. Engr., C. & N. W. Ry, Boulder, Colo ..... June 3, 1903

SWAAB, SOLOMON MARK. Engr. in Chg., Constr., Lardners Point Pumping Station, Philadelphia, Pa ..... Jun. May 3, 1898; Assoc. M. Nov. 1, 1899

SWEITZER, NELSON BOWMAN. U. S. Examiner of Surveys, Gen. Land Office, Valentine, Nebr ..... Jun. Feb. 28, 1893; Assoc. M. Mar. 1, 1899

SWIFT, WILLIAM EVERETT. Engr., Reclamation Service, U. S. Geological Survey, Chamber of Commerce Bldg., Denver, Colo ..... Sept. 2, 1903

SWINDELLS, JOSEPH SPRINGER. San., Hydr. and Const. Engr., 4 West 14th St., Room 117, New York City. Jun. Feb. 2, 1897; Assoc. M. Mar. 2, 1904

SYKES, GEORGE WHITFIELD. Civ. and Cons. Engr., Beaumont, Tex ..... Jun. April 30, 1895; Assoc. M. Dec. 1, 1897

TABER, GEORGE AYMAR. Asst. to Chf. Engr., Dept. of Water Supply, 604 Park Row Bldg., New York City. Jun. April 30, 1895; Assoc. M. June 7, 1899

TAGGART, RALPH CONE. 104 West 128th St., New York City ..... Oct. 5, 1904

TAINTER, FRANK STONE. 92 William St., New York City ..... Jan. 3, 1900

TAIT, HAROLD. Bureau of Sewers, Hackett Bldg., Long Island City, N. Y ..... May 7, 1902

TAIT, JOHN GEORGE. 849 South Burlington Ave., Los Angeles, Cal ..... May 6, 1896

TAYLOR, CHARLES FREDERICK. Engr. and Contr., 913 Tremont Bldg., Boston, Mass ..... Sept. 4, 1895

		Date of Membership.
THEBAN, JOHN GERARD. Engr. in Chg. of Dept. of Bridges, Borough of the Bronx, 700 Southern Boulevard, New York City		Mar. 3, 1897
THOMAS, SAMUEL RICHARDS. Engr. and M. M., Ironton R. R., Hokendauqua, Pa.	Jun.	Oct. 4, 1892
	Assoc. M.	Mar. 1, 1899
THOMES, EDWIN HOWARD. Asst. Engr., Borough of Queens (Res., 150 Willett St., Jamaica), New York City		Dec. 6, 1899
THOMPSON, ARTHUR WEBSTER. Supt., Wheeling Div., B. & O. Ry., Wheeling, W. Va.		June 4, 1902
THOMPSON, CLARENCE HARD. Structural Engr. for The Solvay Process Co., 211 Shonnard St., Syracuse, N. Y.		Sept. 7, 1904
THOMPSON, CLARK WALLACE. Vice-Pres., Wind River Lumber Co., Cascade Locks, Ore.	Jun.	Mar. 5, 1890
	Assoc. M.	July 3, 1895
THOMPSON, MACKEY JAMES. 901 Pioneer Press Bldg., St. Paul, Minn.		Oct. 7, 1903
THOMPSON, ROBERT ANDREW. Chf. Engr., R. R. Comm. of Texas, Austin, Tex.	Jun.	April 6, 1897
	Assoc. M.	Oct. 4, 1899
THOMPSON, SANFORD ELEAZER. Newton Highlands, Mass.		April 1, 1896
THOMSON, ALEXANDER, Jr. Asst. Engr., Rapid Transit Comm., 4 Court Sq. (Res., 351a Quincy St.), Brooklyn, N. Y.	Jun.	Dec. 4, 1900
	Assoc. M.	Feb. 3, 1904
THORNLEY, JULIAN. Senior Asst. Engr., Elec. Development Co. of Ontario, Ltd., Niagara Falls, Ont., Canada		Jan. 2, 1901
THORP, RICHARD FENWICK. Chf. Engr., Kanan Devan Hills Produce Co., Munaar, Madura Dist., South India		Oct. 5, 1904
THROOP, AUGUSTUS THOMPSON. 51 Gluck Bldg., Niagara Falls, N. Y.	Jun.	Oct. 3, 1893
	Assoc. M.	Mar. 3, 1897
TIDD, ARTHUR WARREN. Asst. Engr., New York Aqueduct Comm., Pawling, N. Y.		June 3, 1903
TIERNAN, AUSTIN KING. Civ. and Min. Engr., Box 441, Salt Lake City, Utah		Oct. 5, 1904
TILDEN, CHARLES JOSEPH. Instr. in Civ. Eng., Univ. of Michigan, New Engineering Bldg., Ann Arbor, Mich.	Jun.	May 31, 1898
	Assoc. M.	Feb. 5, 1902
TODD, ALEXANDER MILLER. U. S. Asst. Engr., U. S. Engr. Office, Vicksburg, Miss.	Jun.	Oct. 1, 1895
	Assoc. M.	Oct. 2, 1901
TOLTZ, MAX. Vice-Pres. and Gen. Mgr., Manistee & Grand Rapids R. R., Manistee, Mich		Sept. 7, 1892
TOMPKINS, EDWARD DE VOE. Mgr., Philadelphia Dist., Columbian Fireproofing Co., 26 West 26th St., New York City	Jun.	Feb. 2, 1897
	Assoc. M.	Dec. 3, 1902
TONKIN THOMAS, JUAN. Hydr. Engr., Care, Flint, Eddy & Am. Trading Co., 30 Broad St., New York City		Mar. 7, 1900
TOWER, JAMES WALLACE. Prin. Asst. Engr., Great Northern Paper Co., Millinocket, Me		Oct. 2, 1901
TOWLE, CHARLES STEWART. 7 East 42d St., New York City		May 3, 1899
TOWSON, MORRIS SHERMAN. 16 Bolton Ave., Cleveland, Ohio		Nov. 1, 1893
N. TRATMAN, EDWARD ERNEST RUSSELL. 1636 Monadnock Blk., Chicago, Ill.	Jun.	April 7, 1886
	Assoc. M.	July 1, 1891
TRAVELL, WARREN BERTRAM. Robins Conveying Belt Co., Park Row Bldg., New York City	Jun.	April 30, 1895
	Assoc. M.	Mar. 5, 1902

	Date of Membership.
TREADWAY, HOWARD PLATT. Vice-Pres., Kansas City Bridge Co., 1109 McGee St., Kansas City, Mo.	May 6, 1903
TRIPP, OSCAR HOLMES. Room 30, Court House, Rockland, Me.	Oct. 7, 1896
TROUT, CHARLES ELIPHALET. Asst. Engr., Dept. of Docks and Ferries, Pier A, North River, New York City.	Jun. Oct. 31, 1899 Assoc. M. Jan. 8, 1902
TUCKER, HERMAN FRANKLIN. Room 1107, Exchange Bldg., Boston, Mass.	Dec. 7, 1904
TUCKER, WILLIAM CONQUEST. San. Engr., 156 Fifth Ave., New York City.	Jun. May 5, 1891 Assoc. M. Dec. 5, 1894
TURNEAURE, FREDERICK EUGENE. Dean, Coll. of Eng., Univ. of Wisconsin, Madison, Wis.	Assoc. Aug. 31, 1897 Assoc. M. June 4, 1902
TURNER, DANIEL LAWRENCE. Asst. Engr. in Chg. of Stations, Board of Rapid Transit R. R. Commrs. of New York City, 220 West 107th St., New York City.	Feb. 2, 1898
TURNER, GEORGE DALLAS BAIRD. Pres., West Quincy Min. Co., 512 Atlas Blk. (Res., 424 First St.), Salt Lake City, Utah	Nov. 2, 1898
TURNER, WILLIS TUBBS. Bristol Hotel, San Jose, Cal.	Dec. 7, 1904
TYRRELL, WARREN AYRES. Secy. and Treas., Markmann-Tyrrell Eng. Co., 620 Chestnut St., St. Louis, Mo.	Jun. Oct. 2, 1900 Assoc. M. Oct. 1, 1902
ULRICH, DANIEL. 269 West 136th St., New York City.	Sept. 1, 1897
UMSTEAD, CHARLES HENRY. Supt. of Constr., U. S. Public Bldgs., Office of the Superv. Archt., U. S. Treasury Dept., Lawrence, Mass.	Assoc. May 5, 1903 Assoc. M. May 3, 1904
UPHAM, RICHARD DANA. 11 Broadway, New York City.	Assoc. Oct. 6, 1896 Assoc. M. April 3, 1901
URQUHART, GEORGE COPELAND. Real Estate Agt., Penn. Lines, W. of Pittsburg, 1104 Union Station Bldg., Pittsburg, Pa	May 6, 1891
VAIL, CHARLES DAVIS. Civ. and Hydr. Engr., Room 12, Bee Hive Bldg., Butte, Mont.	June 6, 1900
VAIL, JOHN JERVIS, 102 Fulton St., Rahway, N. J.	Jan. 4, 1905
VAN ALSTYNE, HENRY ARTHUR. State Engr., State Hall, Albany, N. Y.	June 6, 1900
VAN BUSKIRK, CLARENCE RANDALL. Room 17, Bureau of Highways (Res. 108 Van Sicklen St., Brooklyn, N. Y.)	Feb. 3, 1897
VAN ETTEN, LAWRENCE EDWARD. New Rochelle, N. Y.	Dec. 6, 1899
VAN LOAN, SETH MORTON. First Asst. Engr. in Chg., Lardners Point Pipe Distrib. System, 2203 Bridge St., Frankford, Pa.	Jun. Dec. 28, 1900 Assoc. M. Oct. 7, 1903
VAN NORDEN, EARNEST MAITLAND. Acting Civ. Engr., New York Edison Co., 55 Duane St., New York City (Res., 1066 Bergen St., Brooklyn, N. Y.).	May 6, 1903
VAN PELT, SUTTON. U. S. Engr.'s Office, Tuscaloosa, Ala.	Jun. Mar. 6, 1900 Assoc. M. Dec. 2, 1903
VEDELER, GERDT HENRIK. Afdelingsingeniör, Den tekniske Revision, Departementet for de offentlige Arbeider, Victoria Terasse 13, Christiania, Norway	June 7, 1893

Date of Membership.

VENABLE, WILLIAM MAYO. Gen Mgr., San. Eng. Co., 237 Broadway, New York City..... Sept. 4, 1901

VERVEER, EMANUEL LOUIS. 71 West 105th St., New York City..... June 3, 1903

VICKERS, THOMAS MCELDERRY. Mgr., Empire Mfg. Co., Auburn, N. Y., and Waldorf Mfg. Co., Seneca Falls, N. Y., 212 Wayne St., Syracuse, N. Y..... Mar. 2, 1898

VIEH, HENRY. Engr. of Resurveys, N. Y. C. & H. R. R. R. Co., Room 400, Grand Central Station, New York City..... Feb. 7, 1900

VILLALON, JOSÉ RAMON. Prof., Univ. of Havana, Obrapia 14, Havana, Cuba..... Jun. July 4, 1888; Assoc. M. Nov. 6, 1895

VINTON, THOMAS MACINTIRE. Secy. and Treas., Tucker & Vinton, Inc., 156 Fifth Ave., New York City..... Feb. 3, 1904

VOGLESON, JOHN ALBERT. Asst. Engr. in Chg. of Roxboro and Belmont Filters, Bureau of Filtration, Ford Rd. and Belmont Ave., Philadelphia, Pa..... Jan. 2, 1901

VON UNWERTH, HANS. Asst. Engr. to Waddell & Hedrick, Cons. Engrs., 608 New Nelson Bldg., Kansas City, Mo..... May 6, 1903

VOORHEES, PAUL. Engr., The Buffalo & Susquehanna Iron Co. (Res., 195 Lockwood Ave.), Buffalo, N. Y..... Feb. 3, 1892

VOYNOW, CONSTANTINE BORISSON. Asst. Engr., Phil. Rap. Trans. Co., 9th and Dauphin Sts., Philadelphia, Pa..... Sept. 7, 1904

VREDENBURGH, WATSON, Jr. 50 Broadway, New York City..... Mar. 6, 1901

VROOMAN, MORRELL. City Engr., Gloversville, N. Y..... May 7, 1902

WACHTER, CHARLES LUCAS. Asst. Engr., Cableway Dept., Lidgerwood Mfg. Co., 96 Liberty St., New York City. Jun. June 3, 1902; Assoc. M. Oct. 5, 1904

WADA, YOSHICHIKA. Doboku-kwantoku-cho, Nügata, Japan. Jun. Sept. 7, 1887; Assoc. M. Oct. 2, 1895

WADSWORTH, JOEL EDWARD. Res. Engr., Am. Bridge Co., 7 West 22d St., New York City..... Jun. Dec. 5, 1893; Assoc. M. May 5, 1897

WAGNER, JOSEPH CHRISTIAN. Surv. and Regulator, 9th Survey Dist., Dept. of Public Works, Philadelphia; Office, Chelton Ave. and Greene St., Germantown (Res., 1539 North 12th St.), Philadelphia, Pa..... June 7, 1899

WAITE, GUY BENNETT. Pres., Guy B. Waite Co., 31–32 Sts., East River, New York City..... May 2, 1894

WAITT, CHARLES GREENE. Sheldon St., East Milton, Mass..... Jun. Aug. 31, 1897; Assoc. M. Oct. 5, 1898

WALDRON, SAMUEL PAYSON. Care, Am. Bridge Co., 7 West 22d St., New York City..... Jan. 7, 1903

WALKER, JOSEPH JEANES. 7 West 22d St., New York City..... Nov. 5, 1902

WALKER, JOSEPH MILTON. Chf. Engr., Penn. & Mahoning Val. Ry., Youngstown, Ohio..... April 3, 1901

WALLACE, WILLIAM MCGEHEE. 616 Eighteenth St., N. W., Washington, D. C..... Jun. April 3, 1894; Assoc. M. Nov. 6, 1901

WALSH, GEORGE SCHERZER. Res. Engr., Salvador Ry. Co., Ltd., San Salvador, Salvador..... Jun. Feb. 2, 1897; Assoc. M. May 1, 1901

		Date of Membership.
Walther, Edward. Archt., Civ. and Mech. Engr., Logan Sq., Chicago, Ill.		May 1, 1895
Warrington, Harry Esmond. Asst. Engr., C., N. O. & T. P. Ry. Co., and A. G. S. R. R., 66 Ingalls Bldg., Cincinnati, Ohio.		April 6, 1898
Washington, William de Hertburne. 26 Broadway, New York City.		Oct. 5, 1892
Watson, Irvine. First Asst. City Engr. (605 Reibold Bldg.) Dayton, Ohio.		June 3, 1903
Watson, Walter. Salem, Va.		April 5, 1893
Webster, Albert Lowry. Cons. Civ. and San. Engr., 82 Wall St., New York City.	Jun. Assoc. M.	Sept. 6, 1882 June 3, 1891
Wentworth, Charles Austin. Civ. Engr., U. S. N., Naval Station, Guantanamo Bay, Cuba, Care, Postmaster, New York City.		Oct. 7, 1903
West, Oscar James. Res. Engr., The Phœnix Bridge Co., 453 The Rookery, Chicago, Ill.		May 4, 1904
Weston, Robert Spurr. San. Engr., 14 Beacon St., Boston, Mass.		Feb. 5, 1902
Weymouth, Frank Elwin. Dist. Engr., U. S. Reclamation Service, Glendive, Mont.		Sept. 4, 1901
Wheatley, Arthur Cornwallis. Address unknown.	Jun. Assoc. M.	May 7, 1890 Mar. 6, 1895
Wheeler, Harry Roberts. 1 Broadway, New York City.	Jun. Assoc. M.	April 4, 1888 May 4, 1892
Wheeler, Ralph Norman. Engr., The T. A. Gillespie Co., 71 Broadway, New York City.		Jan. 7, 1903
Wheelock, De Forest Augustus. Chf. Engr., E. & H. R. R. Co.; County Surv., Warren County, Pa.; City Engr., Warren, Pa.		Feb. 3, 1897
Whipple, George Chandler. Cons. Engr., 220 Broadway, New York City.		Sept. 6, 1899
Whiskeman, James Peter. Civ. Engr., Bureau of Bldgs., Borough of Manhattan, 220 Fourth Ave., New York City.	Jun. Assoc. M.	Jan. 31, 1899 Nov. 7, 1900
White, Frank George. Chf. Draftsman, Office of City Engr., Salt Lake City, Utah	Jun. Assoc. M.	Dec. 3, 1901 Dec. 7, 1904
White, Lazarus. Asst. Engr., Rapid Transit R. R. Comm., 4 Court Sq., (Res., 450 St. Johns Pl.), Brooklyn, N. Y.	Jun. Assoc. M.	May 1, 1900 Feb. 4, 1903
White, William MacIntire. Asst., Estimating Dept., Am. Bridge Co., 802 Frick Bldg., Pittsburg, Pa.		Jan. 2, 1901
Whited, Willis. Asst. Engr., Dept. Public Works, City Hall, Pittsburg, Pa		Oct. 2, 1901
Whitford, Noble Earl. 11 South Lexington Ave., Albany, N. Y.		Feb. 1, 1905
Whittemore, Walter Frank. 1 Newark St., Hoboken, N. J.	Jun. Assoc. M.	Mar. 6, 1889 April 6, 1892
Wickes, Edward Dana. Min. Engr., Low Moor Iron Co. of Va., Low Moor, Va.		Dec. 3, 1902
Wickes, Joseph Lee. Commr. of Street Cleaning, Baltimore, Md.		Mar. 2, 1904
Wiggin, Ernest Woodbury. Bridge Insp., N. Y., N. H. & H. R. R., New Haven, Conn.	Jun. Assoc. M.	May 5, 1896 May 7, 1902

Date of Membership.

WIGGIN, THOMAS HOLLIS. Prin. Div. Engr., Bureau of Filtration, 753 Mellon St., Pittsburg, Pa..... April 2, 1902

WIGGINS, WILLIAM D. Engr., M. of W., Pittsburg Div., Pitts., Cin., Chic. & St. L. Ry , 1013 Penn Ave., Pittsburg, Pa..... Oct. 2, 1901

WILCOX, FRED ELMER. 956 Orange Grove Boulevard, Pasadena, Cal... April 1, 1896

C. WILD, HERBERT JOSEPH. Asst. to Supt. of Constr., U. S. Life-Saving Service, 721 Broad St., Meriden, Conn. { Jun. Mar. 31, 1903; Assoc. M. April 6, 1904

WILGUS, HERBERT SEDGWICK. Engr., Way and Structure, B. H. R. R. (Res., 90 Green Ave.), Brooklyn, N. Y. { Jun. Oct. 1, 1901; Assoc. Nov. 3, 1903; Assoc. M. Nov. 1, 1904

WILKERSON, THOMAS JEFFERSON. Engr., Bridge Designs and Estimates, Am. Bridge Co., 802 Frick Bldg., Apartment 109, Buckingham, Pittsburg, Pa ..... { Jun. April 3, 1894; Assoc. M. Jan. 5, 1898

WILKES, JAMES KNAPP. Chf. Engr. of Sewers, City Hall, New Rochelle, N. Y..... June 3, 1891

WILKINS, GEORGE SHREVE. Care, H. F. Ayres, 203 West 14th St., New York City..... { Jun. Oct. 4, 1892; Assoc. M. Oct. 5, 1898

WILLIAMS, PARLEY LYCURGUS, Jr. Supt., Highland Boy Mines, Utah Cons. Min. Co., Bingham, Utah..... Sept. 7, 1904

WILLIAMS, SAMUEL DAUGHERTY, Jr. Chf. Engr., The Tol., Ind. & S. W. Ry. Co., Terminal Station, Toledo, Ohio..... Dec. 2, 1903

WILLIAMS, WALTER SCOTT. Asst. Prof. in Civ. Eng., Univ. of Missouri, 509 Hitt St., Columbia, Mo ..... April 6, 1904

WILLS, ARTHUR JOHN. 2881 Woodbrook Ave., Baltimore, Md..... May 7, 1902

WILSON, CHARLES WILLIAM SCHRAGE. Engr., Naughton Co., 258 Broadway, New York City (Res., New Rochelle, N. Y.)..... { Jun. April 5, 1892; Assoc. M. Jan. 3, 1900

WILSON, HENRY FELIX, Jr. Cons., Civ. and Min. Engr. (Wilson & Alber), Room 205, First National Bank Bldg., Birmingham, Ala. April 2, 1902

WILSON, PERCY HARTSHORNE. Secy. and Treas., River & Harbor Impvt. Co., 501 Mariner & Merchant Bldg., Philadelphia, Pa..... { Jun. Jan. 2, 1900; Assoc. M. Feb. 5, 1902

WILSON, THOMAS WILLIAM. Chf. Engr., International Ry. Co., Buffalo, N. Y..... April 4, 1900

WILTSEE, WILLIAM PHARO. Asst. Engr., Norfolk & West. Ry. Co., Kenova, W. Va..... Oct. 7, 1903

WINFREE, PEYTON BROWN. Res. Engr., Lynchburg Gravity Water Supply Constr., Lynchburg, Va..... { Jun. Oct. 2, 1894; Assoc. M. May 3, 1898

WING, CHARLES BENJAMIN. Prof. of Structural Eng., Stanford Univ., Palo Alto, Cal..... Nov. 4, 1896

WING, FREDERICK KELLY. 110 White Bldg., Buffalo, N. Y. { Jun. May 31, 1892; Assoc. M. Nov. 1, 1899

WINN, WALTER SCOTT. U. S. Asst. Engr., R. F. D. No. 5, Florence, Ala..... Oct. 6, 1897

WINSOR, FRANK EDWARD. Div. Engr., Charles River Basin Comm., 367 Boylston St., Boston, Mass..... Nov. 4, 1903

ASSOCIATE MEMBERS W–Z

		Date of Membership.
Wood, Irving Sparrow. Asst. Engr. in Chg. of Water Dept., City Engr.'s Office, Providence, R. I.	Jun.	Mar. 5, 1890
	Assoc. M.	Mar. 7, 1900
Wood, Winthrop Barrett. Civ. and Mech. Engr. for The Wanskuck Co., 725 Branch Ave., Providence, R. I.		April 6, 1904
Woodard, Wilkie. Vice-Pres. and Chf. Engr., Union Terminal R. R. Co., Union Trust Bldg., Cincinnati, Ohio		May 4, 1904
Woodruff, James Albert. Capt., Corps of Engrs., U. S. A., West Point, N. Y.		Dec. 2, 1903
Woods, Andrew Alfred, Jr. Res. Engr., A. & V. Ry. and Vicksburg, Shreveport & Pacific Ry., Vicksburg, Miss.		May 4, 1904
Wortendyke, Nicholas Doremus. Asst. Chf. Engr., Street and Water Board (Res., 108 Bentley Ave.), Jersey City, N. J.		Feb. 1, 1899
Wright, Joseph. U. S. Junior Engr., I. & M. Canal, Wyanet, Ill.		Dec. 7, 1904
Wright, Moses Hannibal. Asst. Engr., A. K. & N. Ry., 512 Prudential Bldg., Atlanta, Ga.	Jun.	Jan. 2, 1900
	Assoc. M.	Sept. 3, 1902
Yereance, William Burnet. 24 Broad St., New York City (Res., 418 Center St., South Orange, N. J.).	Jun.	May 3, 1892
	Assoc. M.	Dec. 2, 1896
Young, Eddy Elbert. 86 Islington Rd., Auburndale, Mass.		Jan. 6, 1904
Young, Henry Amerman. In Chg. of Constr. Work for U. S. Engr. Dept. at Fort Washington, Md., and Fort Hunt, Va.; Address, U. S. Engr. Office, Fort Washington, Md.	Jun.	Mar. 5, 1901
	Assoc. M.	Dec. 2, 1903
Zarbell, Elmer. Engr., M. of W., L. & N. R. R., Anniston, Ala.	Jun.	Jan. 3, 1899
	Assoc. M.	Feb. 7, 1900
Zeller, Albert Henry. 1009 Fullerton Bldg., St. Louis, Mo.	Jun.	May 7, 1890
	Assoc. M.	April 7, 1897
Zorn, George Washington. Cody, Wyo.		Dec. 7, 1904

Associate Members, 918.

ASSOCIATES.

[Assoc. Am. Soc. C. E.]

Date of Membership.

ABBOTT, EDWARD LORENZO. 71 Broadway, New York City... { Jun. Sept. 1, 1886 / Assoc. April 30, 1895

ABBOTT, WILLIAM LATHAM. Westinghouse Bldg., Pittsburg, Pa..... May 1, 1889

ACKERMAN, ERNEST ROBINSON. 1 Broadway, New York City..... May 1, 1900

AUCHINCLOSS, JOHN WINTHROP. 22 William St., New York City..... April 2, 1901

BARNES, WILLIAM HENRY. Pres. of the Allegheny Val. Ry. Co. and the West. N. Y. & Penn. Ry. Co. (Buffalo and Allegheny Div. of P. R. R. Co.), 256 Gen. Office, P. R. R. Co., Philadelphia, Pa..... Sept. 2, 1885

BELDEN, EDGAR TWEEDY. 108 Lawn Ave., Middletown, Conn..... Mar. 5, 1901

BENNETT, LESLIE J. Secy., Buffalo Cement Co., 110 Franklin St., Buffalo, N. Y..... Jan. 7, 1902

BENT, STEDMAN. Purchasing Agt., The Penn. Steel Co., Girard Trust Bldg., Philadelphia (Res., Overbrook), Pa..... Dec. 2, 1902

BERNEGAU, RUDOLF CASPAR CARL MARIE. Treas., Keuffel & Esser Co., 127 Fulton St., New York City..... Feb. 3, 1903

BERTHELET, JOSEPH R. Mgr., Milwaukee Cement Co., Milwaukee, Wis..... Nov. 1, 1898

BOGART, SAMUEL STOCKTON. Engr., The New York Continental Jewell Filtration Co., 15 Broad St., New York City (Res., Dumont, Bergen Co., N. J.)..... April 7, 1886

BOOTH, WILLIAM FERRIS. Poughkeepsie, N. Y..... { Jun. Jan. 7, 1885 / Assoc. April 30, 1895

BRADLEY, CHARLES WHITING. 1064 Ellicott Sq , Buffalo, N. Y..... June 19, 1891

BRAINE, LAWRENCE FULTON. Gen. Mgr., Continuous Rail Joint Co. of America, Newark, N. J..... Sept. 6, 1898

BROWN, THANE ROSS. With Wisconsin Bridge & Iron Co., North Milwaukee, Wis..... { Jun. Mar. 31, 1896 / Assoc. Oct. 2, 1900

BURNHAM, GEORGE, Jr. (Burnham, Williams & Co.), Proprs., Baldwin Locomotive Works, Philadelphia, Pa..... { Jun. Jan. 6, 1875 / Assoc. July 2, 1890

BURROWS, GEORGE LORD. Saginaw, W. S., Mich..... Feb. 3, 1886

CAIRD, JAMES MORTON. Chemist and Bacteriologist, 271 River St., Troy, N. Y..... Oct. 5, 1904

CHAPMAN, MELLVILLE DOUGLAS. Banker and Broker (E. R. Chapman & Co.), 80 Broadway, New York City..... Sept. 1, 1896

Date of Membership.

CHURCH, IRVING PORTER. Prof. of Applied Mechanics and Hydraulics, Cornell Univ., Ithaca, N. Y. ..... Oct. 1, 1901

CLARK, LUDLOW VICTOR. 619 Harrison Bldg., Philadelphia, Pa. ..... Oct. 4, 1892

COLBY, SAFFORD KINKEAD. Contr. Engr. and Mgr., Eastern Office, The Pittsburg Reduction Co., 99 John St., New York City. ..... { Jun. Mar. 5, 1895 / Assoc. Jan. 6, 1904

COLSTEN, ALBERT LLOYD. Teacher, Manual Training High School, Brooklyn, N. Y. ..... Sept. 3, 1901

COMFORT, SILAS GILDERSLEEVE. Vice-Pres. and Prof. of Eng., Pennsylvania Military Coll., Chester, Pa ..... Mar. 31, 1891

COMPTON, ALFRED G. Prof. of Physics, The Coll. of the City of New York, 17 Lexington Ave. (Res., 40 West 126th St.), New York City. ..... Sept. 5, 1877

COPELAND WILLIAM ROGERS. 1904 Green St., Philadelphia, Pa. ..... Feb. 4, 1902

CRAFTS, GEORGE HENRY. Civ. Engr. and Contr., 164 Forrest Ave., Atlanta, Ga. ..... April 4, 1888

CURRIER, CHARLES GILMAN. 313 West 102d St., New York City. ..... June 21, 1894

DAILEY, JOHN ALEXANDER. 40 Sanford St., East Orange, N. J. ..... Sept. 7, 1904

DEWEY, CHARLES ELLIS. 46 Bank Bldg., Watertown, N. Y. ..... Nov. 5, 1901

DIVEN, JOHN M. Secy. and Treas., Elmira Water, Light & R. R. Co., Elmira, N. Y. ..... Sept. 10, 1891

DOUGLASS, ANTHONY CHILEON. Gen. Contr., Niagara Falls, N. Y. ..... April 30, 1895

DRUMMOND, THOMAS JOSEPH. Pres., Londonderry Iron & Min. Co., Ltd., Montreal, Que., Canada ..... Mar. 6, 1894

DUBARRY, EDMUND LOUIS. Supt., Terminals, N. & W. Ry., Norfolk, Va. ..... Jan. 6, 1875

ECKEL, EDWIN CLARENCE. Asst. Geologist, U. S. Geological Survey, Washington, D. C. ..... Mar. 5, 1901

ELLIOTT, HOWARD. Pres., N. P. Ry. Co., St. Paul, Minn ..... June 5, 1900

FARRELL, EDWARD JAMES. 355 West 145th St., New York City. ..... June 6, 1899

FISHBURNE, EDWARD BELL, Jr. Pres., Hoge Memorial Military Academy, Blackstone, Va. ..... Dec. 5, 1899

FISK, WILBUR CHAPMAN. 24 Nassau St., New York City. ..... Oct. 4, 1892

FLETCHER, ROBERT. Director of Thayer School of Civ. Eng., Dartmouth Coll., Hanover, N. H. ..... Nov. 4, 1874

FOSTER, CLARENCE MARVIN. Secy., Meacham & Wright Co., 920 Chamber of Commerce Bldg., Chicago, Ill. ..... Jan. 31, 1899

FREEMAN, FRANK LESLIE. 1756 N St., Washington, D. C. ..... Nov. 5, 1895

FROST, GEORGE HENRY. Pres. and Treas., The Eng. News Pub. Co., 220 Broadway, New York City. ..... Jan. 4, 1882

FULLER, ALMON HOMER. Prof. of Civ. Eng., Univ. of Washington, University Station, Seattle, Wash. ..... { Jun. April 4, 1899 / Assoc. Feb. 4, 1902

FUTAMI, KYOSABURO. Prof. of Civ. Eng., Kyoto Imperial Univ., Kyoto, Japan ..... June 5, 1889

Date of Membership.

GAINES, FRANKLIN LINCOLN. Vice-Pres. and Gen. Supt. of Constr., Grand Rapids Bridge Co., 612 Pythian Temple, Grand Rapids, Mich. ..... April 1, 1902

GIBSON, WILLIAM, Jr. 122 Fenimore St., Brooklyn, N. Y. ..... Sept. 5, 1888

GILDERSLEEVE, ALGER CROCHERON. 39 Cortlandt St. (Res., 28 West 48th St.), New York City. ..... { Jun. Feb. 6, 1894 / Assoc. April 4, 1899

GOLDING, JOHN FRENCH. 1471 Park St., N. W., Washington, D. C. ..... Feb. 3, 1904

GOLDSBOROUGH, JOHN BYRON. Supt. Constr., New Croton Dam, Croton-on-Hudson, N. Y. ..... April 4, 1899

GOODELL, JOHN MILTON. Editor, *The Engineering Record*, 114 Liberty St., New York City ..... July 29, 1891

GRAHAM, WILLIAM WOODMAN. Care, American Bank, City of Mexico, Mexico ..... Dec. 6, 1898

HARDWICKE, ALAN HYDE GARDNER. Niagara Falls, N. Y. ..... June 4, 1884

HARRIS, CHARLES MARSHALL. 58 William St., New York City. ..... Jan. 8, 1873

HARRISON, LOUIS BALDWIN. Fifth Ave. Hotel, Troy, N. Y. ..... May 5, 1896

HARTRANFT, WILLIAM GARRIGUES. Pres., Wm. G. Hartranft Cement Co., Real Estate Trust Bldg., Philadelphia, Pa. ..... May 3, 1898

HAZEN, JOHN VOSE. Prof. of Civ. Eng. and Graphics in Dartmouth Coll., Hanover, N. H. ..... June 5, 1889

HENNESSEY, CHARLES FRANCIS ASA. 948 Park Ave., New York City. ..... Jan. 7, 1902

HUNSIKER, MILLARD. 4 Park St., Park Lane, London, W., England. ..... June 5, 1889

HUSTON, JAMES ARCHIBALD. Gen. Mgr., Am. Bridge Co., 826 Frick Bldg., Pittsburg, Pa. ..... Aug. 31, 1897

JACOBY, HENRY SYLVESTER. Prof. of Bridge Eng., Cornell Univ., 7 Reservoir Ave., Ithaca, N. Y. ..... Nov. 5, 1890

KALTENBACH, HENRY JULIUS. Park Hill, Yonkers, N. Y. ..... June 3, 1902

KARNER, WILLIAM JOSIAH. Res. Engr., Isthmian Canal Comm., Ancon, Canal Zone, Panama, Care, New York Post Office ..... July 2, 1890

KELLER, OTTO BALTHAZAR. Eng. and Govt. Representative of Keuffel & Esser Co., 127 Fulton St., New York City ..... Feb. 3, 1903

KING, HARRY WHEELOCK. Vice-Pres., The King Bridge Co., Cleveland, Ohio ..... June 19, 1891

KING, WALLACE, Jr. Vice-Pres., United Bldg. Material Co., 13 Park Row, New York City ..... Dec. 4, 1900

LA FARGE, OLIVER HAZARD PERRY. Insurance, Erikson Bldg., Seattle, Wash ..... April 5, 1898

LEATHER, BASIL HENRY. 1133 Broadway, New York City ..... June 1, 1904

LESLEY, ROBERT WHITMAN. Pres., Am. Cement Co., Room 604, Pennsylvania Bldg., Philadelphia, Pa. ..... Jan. 31, 1893

LIEBMANN, ALFRED. 58 West 58th St., New York City ..... June 3, 1902

LIVINGSTON, JULIUS I. Bound Brook, N. J. ..... July 3, 1889

LOWE, HOUSTON. Vice-Pres., The Lowe Bros. Co., Dayton, Ohio. ..... June 3, 1902

	Date of Membership
LYMAN, RICHARD ROSWELL. Prof. of Civ. Eng., Univ. of Utah (Res., 1084 Third St.), Salt Lake City, Utah	May 4, 1904
MACGREGOR, JOHN. Engr., The United States Fidelity & Guaranty Co. of Baltimore, Md., 928 West Ferry St., Buffalo, N. Y.	June 2, 1903
MCKENNA, CHARLES FRANCIS. Chemist, 221 Pearl St., New York City.	June 5, 1894
MAIGNEN, JEAN PROSPER AUGUSTE. 1310 Arch St., Philadelphia, Pa.	Oct. 3, 1899
MANN, JOHN LAROY. Assoc. Prof. Civ. Eng., Thayer School of Civ. Eng., Hanover, N. H.	Jun. April 2, 1901 Assoc. May 6, 1902
MEYER, HENRY CODDINGTON, Jr. Cons. Mech. Engr., 1 Madison Ave., New York City (Res., Montclair, N. J.).	Jun. Jan. 3, 1893 Assoc. Dec. 28, 1900
MONAHAN, JOHN JOSEPH. 113 Devonshire St., Boston, Mass.	June 1, 1904
MONKS, JOHN, Jr. 130 Water St. (Res., 139 West 121st St.), New York City	May 31, 1898
MOXHAM, ARTHUR JAMES. Vice-Pres., E. J. du Pont de Nemours Powder Co., Wilmington, Del	Nov. 2, 1887
NORTON, HENRY LORD. Bridge Engr. and Contr., 33 Lyman St., Springfield, Mass.	May 4, 1897
OASTLER, WILLIAM CHURCHILL. Pres., Am. Road Roller Co., 156 Fifth Ave., New York City	Mar. 31, 1891
ODELL, RUTLEDGE IRVING. Vice-Pres., The Tomkins Cove Stone Co., Tomkins Cove, N. Y.	Oct. 1, 1895
OLDS, WILLIAM CLARENCE. Erie, Pa.	Nov. 3, 1903
PACKARD, RALPH GOODING, Jr. 130 Pearl St., New York City.	Sept. 3, 1901
PALMER, WILLIAM PENDLETON. Pres., Am. Steel & Wire Co., Western Reserve Bldg., Cleveland, Ohio	Mar. 3, 1896
PARSONS, GEORGE WELLMAN. Cons. Engr., The Pennsylvania Steel Co., Steelton, Pa.	Sept. 3, 1884
PEVERLEY, RALPH. Fuller Bldg., New York City.	Dec. 6, 1898
PHILLIPS, HENRY AYLING. Archt., 120 Tremont St., Boston, Mass.	April 7, 1886
PHIPPS, LAWRENCE COWLE. 1154 East Colfax Ave., Denver, Colo.	Jan. 31, 1899
PINCHOT, GIFFORD. Forester, U. S. Dept. of Agriculture, 1615 Rhode Island Ave., N. W., Washington, D. C.	Mar. 4, 1902
PIPER, ALEXANDER ROSS. Gen. Supt., Am. Ry. Traffic Co., 44 Court St. (Res., 254 Eighty-third St.), Brooklyn, N. Y.	June 5, 1900
POLK, WILLIAM ANDERSON. Care, The Patterson Sargent Co., 42 Hudson St., New York City.	May 4, 1897
POMEROY, LEWIS ROBERTS. Care, Gen. Elec. Co., 44 Broad St., New York City	April 2, 1890
QUINCY, CHARLES FREDERICK. 1175 Old Colony Bldg., Chicago, Ill.	Feb. 4, 1896
QUIRK, EUGENE MCGRATH. Contr., 698 Boulevard, Ville St. Louis, Montreal, Que., Canada	Feb. 3, 1903

	Date of Membership.
RANSOME, ERNEST LESLIE. Concrete Engr., Cor. Westervelt and Fourth Aves., Tompkinsville, N. Y.	June 5, 1894
RICHARDSON, CLIFFORD. Director, New York Testing Laboratory, Long Island City, N. Y. (Res., 122 East 34th St., New York City)	Oct. 4, 1892
ROBERTS, WILLIAM. 540 South St., Waltham, Mass.	June 4, 1884
ROGERS, EDWARD ALVERSON. Address unknown	Dec. 1, 1896
SAEGER, CHARLES MARSHALL. Gen. Mgr., Coplay Cement Mfg. Co., 1320 Hamilton St., Allentown, Pa.	May 2, 1893
SAPH, AUGUSTUS VALENTINE. Engr., Reclamation Service, U. S. Geological Survey, Hazen, Nev.	Oct. 1, 1901
SELL, WILLIAM DRUMM. Chf. Engr., Gallego Coal & Land Co., Room 6, Charleston National Bank Bldg. (P. O. Box 222), Charleston, Kanawha Co., W. Va.	Jun. Dec. 3, 1891 Assoc. May 2, 1899
SMITH, FRANCIS HOPKINSON. 16 Exchange Pl., New York City	April 5, 1892
SMITH, HERBERT STEARNS SQUIER. Prof. of Applied Mechanics, Princeton Univ., P. O. Box 171, Princeton, N. J.	Sept. 10, 1891
SNARE, FREDERICK. 39 Cortlandt St., New York City	Oct. 6, 1903
SPEED, JAMES BRECKINRIDGE. Pres., Western Cement Assoc., Louisville, Ky.	May 2, 1888
STOWE, CHARLES BROWN. Superior Bldg., Cleveland, Ohio	Oct. 4, 1898
TENNEY, GEORGE OLIVER. Contr., Spartanburg, S. C.	Jun. Sept. 7, 1887 Assoc. Feb. 5, 1901
THORN, ALFRED WILLIAM. Gen. Mgr., Thorn Cement Co., Buffalo, N. Y.	Oct. 2, 1900
TOCH, MAXIMILIAN. Chemist for Toch Bros., 468 West Broadway, New York City	Sept. 1, 1903
TOMKINS, CALVIN. 17 Battery Pl., New York City	Jan. 6, 1886
TRAUTWINE, JOHN CRESSON, Jr. 257 South Fourth St., Philadelphia, Pa.	Dec. 5, 1888
TURRILL, SHERMAN MARSH. Instr. in Civ. Eng., Lehigh Univ., South Bethlehem (Res., 54 Church St., Bethlehem), Pa.	Oct. 1, 1901
WARDER, JOHN HAINES. Secy., Western Society of Engrs., 1737 Monadnock Blk., Chicago, Ill	Mar. 7, 1888
WATSON, MERRILL. Mgr., Expanded Metal Eng. Co., 256 Broadway, New York City	Oct. 7, 1902
WEBER, GEORGE ADAM. Secy., The Weber Ry. Joint Mfg. Co., 71 Broadway, New York City	Feb. 6, 1900
WELLS, JOSEPH AGUR. The Fairbanks Co., Broome and Elm Sts., New York City	Jan. 7, 1896
WILCOCK, FREDERICK. Asst. Engr., Rapid Transit R. R. Comm., New York City (Res., 862 Fiftieth St., Brooklyn, N. Y.)	Jun. Jan. 7, 1902 Assoc. Oct. 6, 1903
WILLSON, FREDERICK NEWTON. Prof. of Descriptive Geometry and Technical Drawing, Princeton Univ., Box 63, Princeton, N. J.	Jun. Sept. 5, 1883 Assoc. Oct. 4, 1892

Date of Membership.

YOUNG, CHARLES GRIFFITH. Gen. Supt. of Constr., J. G. White & Co., Inc., 43 Exchange Pl., New York City..... Mar. 6, 1894

ZIPPERLEIN, JOSEPH WILLIAM. Vice-Pres., Wm. G. Hartranft Cement Co., Real Estate Trust Bldg., Philadelphia, Pa..... June 4, 1901

Associates, 123.

JUNIORS.

[Jun. Am. Soc. C. E.]

Date of Membership.

ADAMS, EDWARD MAGUIRE. 1st Lieut., Corps of Engrs., U. S. A., Manila, Philippine Islands..... Oct. 7, 1902

ADAMS, RAYMOND EDMOND. Civ. Engr., Quartermaster-General's Office, Room 394, State, War & Navy Bldg., Washington, D. C..... May 1, 1900

ADEY, JOHN SEAGER. 445 Lenox Ave., New York City..... Feb. 3, 1903

ALEXANDER, ROBERT LEE. U. S. Surveyman, Mound, Chittenden Co., Ark..... Nov. 1, 1904

ARMSTRONG, ALEXANDER FLOYD. Asst. Engr. on Manila Sewer System, Office, City Engr., Manila, Philippine Islands..... Oct. 7, 1902

ARN, WILLIAM GODFREY. Asst. Engr., L. & N. R. R., Montgomery, Ala. Oct. 2, 1900

BABÉ, JOSEPH MANUEL. First Asst. Engr., Dept. of Public Works, Cerro 440 B, Havana, Cuba..... May 31, 1904

BACKES, WILLIAM JAMES. 24 Ward Pl., West Haven, Conn..... May 31, 1904

BAKER, HAROLD JAMES MANNING. Surveyman, U. S. E. D., Fort Flagler, Wash..... Oct. 7, 1902

BALL, LAURENCE ADAMS. Structural Engr. for Reed & Stern, Archts., 5 East 42d St., New York City..... May 3, 1904

BANKER, EDWARD WARREN. 2d Lieut., U. S. Marine Corps, U. S. S. Illinois, Care, Navy Dept., Washington, D. C..... Mar. 1, 1904

BARNES, WALTER ESMOND. 45 Lincoln St., Malden, Mass..... May 6, 1902

BARRETT, ROBERT EDWARD. Framingham, Mass..... Jan. 31, 1905

BAXTER, DAVID ELDER. 32 West 60th St., New York City..... May 2, 1899

BECKER, SYLVANUS A. 840 Delaware Ave., So. Bethlehem, Pa..... Dec. 1, 1903

BEEKMAN, JOHN VAN DERVEER, Jr. Boston Mgr., Purdy & Henderson, 101 Tremont St., Boston, Mass..... Sept. 3, 1901

BELCHER, WALLACE EDWARD. Civ. Engr. with Frank B. Gilbreth, 176 Federal St., Boston, Mass..... Dec. 2, 1902

BELL, BERTRAND FAUGÈRES. 220 Broadway, New York City..... June 3, 1902

BELZNER, THEODORE. Insp. of Steel Constr., East Side Viaduct, Sec. 10, Fourth Div., Rapid Transit R. R. Comm., 231 West 125th St. (Res., 301 West 150th St.), New York City..... Oct. 5, 1897

BENTON, LEWIS STEUERWALD. Office of 2d Asst. Engr., L. S. & M. S. Ry., Cleveland, Ohio..... Nov. 5, 1901

BERRY, FRANCIS RIGDON. Care, Birmingham Water-Works Co., Birmingham, Ala..... Dec. 2, 1902

Date of Membership,

Birks, Arthur Henry. With Phœnix Bridge Co., Phœnixville, Pa... April 5, 1904

Black, Roger Derby. 2d Lieut., Corps of Engrs., U. S. A., War Dept., Washington, D. C..... Jan. 3, 1905

Blackburn, Nathaniel Townsend. U. S. Junior Engr., U. S. Engr.'s Office, Galveston, Tex..... Sept. 6, 1904

Blackwell, Paul Alexander. Canonsburg, Pa..... Dec. 4, 1900

Blanchard, Arthur Horace. Asst. Prof. of Civ. Eng., Brown Univ.; Asst. Engr., State Board of Public Roads of Rhode Island; Brown Univ., Providence, R. I..... Jan. 2, 1900

Borland, Bruce. 2027 Prairie Ave., Chicago, Ill..... Mar. 3, 1903

Bouton, Harold. 89 Danforth Ave., Jersey City, N. J..... May 2, 1899

Bowditch, Ernest W. Landscape Gardener and Civ. Engr., 68 Devonshire St., Boston, Mass..... Feb. 3, 1875

Braslow, Barnett. Eng. Dept., Thompson-Starrett Co., 51 Wall St. (Res., 73 West 115th St.), New York City..... Nov. 3, 1903

Breuchaud, Jules Rowley. With Coleman, Breuchaud & Coleman, Contrs., New Croton Dam, Croton-on-Hudson, N. Y..... Nov. 1, 1904

Brillhart, Jacob Herbst. Transitman, Penn. Coal Co., Box 42, Port Griffith, Luzerne Co., Pa..... Nov. 1, 1904

Brinkley, Milo Hamilton. 3343 Calumet Ave., Chicago, Ill..... Mar. 1, 1904

Brown, Alfred Thomas. Dept. of Highways, Borough of the Bronx, Cor. 177th St. and 3d Ave., New York City..... Nov. 1, 1904

Brown, Collingwood Bruce, Jr. Asst. Div. Engr., Canadian Pacific Ry., Calgary, Canada..... Oct. 1, 1901

Brown, William Clinton. Cons. Engr., 512 William St., Montreal, Que., Canada..... Sept. 1, 1886

Brush, William Whitlock. Asst. Engr., Dept. of Water Supply, Gas and Electricity, Room 41, Municipal Bldg., Brooklyn, N. Y.... Mar. 3, 1896

Buck, Henry Robinson. Asst. City Engr., P. O. Box 213, Hartford, Conn..... June 5, 1900

Bumsted, Eugene Bradford. Gen. Mgr., St. Lawrence River Power Co., Massena, N. Y..... May 1, 1900

Bunnel, William Cyrus. U. S. Engr. Office, Manila, Philippine Islands..... Oct. 1, 1901

Burgoyne, John Henry, Jr. Asst. Engr., Buffalo & Susquehanna R. R., Box 1393, Galeton, Pa..... Sept. 1, 1903

Burrage, John Otis. 2325 Fillmore St., San Francisco, Cal..... ... Mar. 1, 1904

Burwell, Robert Lemmon. 140 Willow St., Brooklyn, N. Y..... Dec. 3, 1901

Cáceres, Simon Novelo. Box 255, National City, Cal..... June 6, 1899

Cameron, Kenneth Mackenzie. Canadian Niagara Power Co., Niagara Falls, Ont., Canada..... Oct. 6, 1903

Carlin, Joseph Patrick. Secy., P. J. Carlin Constr. Co., 1 Madison Ave., New York City..... Oct. 4, 1898

Castellanos, Cesar. Ingeniero Asistente en las Obras del Gran Teatro Nacional, Pasco de la Reforma 79, City of Mexico, Mexico..... Oct. 6, 1903

Date of Membership.

CETTI, CAROLUS HERMANN ZANE-. Cons. Engr., Fort Worth, Tex.... Feb. 3, 1903

CHADBOURN, WILLIAM HOBBS, Jr. U. S. Asst. Engr., U. S. Engr. Office, Beaver, Pa..... Dec. 3, 1890

CHADBOURNE, EDWARD MERRIAM. 121 New Montgomery St., San Francisco, Cal..... Nov. 3, 1903

CLARK, JOHN A., Jr. Supt., Distrib. of Public Service, Corporation of N. J. Gas Dept., 260 North Park St., East Orange, N. J..... Aug. 31, 1897

CLARK, WILLIAM GEORGE. 1043 Spitzer Bldg., Toledo, Ohio..... April 4, 1888

CLASS, CHARLES FRANK. Care, Eng. Dept., Virginia Bridge & Iron Co., Roanoke, Va..... Mar. 3, 1903

CLAUSNITZER, JOHN. Engr. Insp., 21 Municipal Bldg., Brooklyn, N. Y. Mar. 3, 1903

CLEAVER, PITSON JAY. Fort Edward, N. Y..... April 4, 1899

COBB, SAMUEL ALLEN. City Engr., Muskogee, Ind. T..... June 3, 1902

CODWISE, HENRY ROGERS. Instr. in Eng., Poly. Inst. of Brooklyn and Instr. in Eng. Field Work and Math., Cooper Union Schools of Science and Art, New York City..... April 2, 1901

COFFIN, THEODORE DELONG. Insp., Filter Plants, Dept. Water Supply, Borough of Brooklyn, 128 Union Hall St., Jamaica, N. Y.. Nov. 1. 1904

CONSTANCE, EDWARD CARTWRIGHT. 428 Custom House, St. Louis, Mo. Dec. 6, 1904

COOPER, KENNETH FARRA. Asst. Engr., Bay Cities Water Co., Smith Creek, *via* San José, Cal..... Oct. 6, 1903

CORNELL, JOHN NELSON HAYWARD. 312 Manhattan Ave., New York City. May 1, 1889

CORNISH, LORENZO DANA. U. S. Junior Engr., U. S. Engr. Office, Beaver, Pa..... April 5, 1904

COTTON, MILES PENNER. Asst. Engr., Constr. Dept., Canadian Pacific Ry., Winnipeg, Man., Canada ..... Oct. 6, 1903

CRANE, WILL EDWIN. 18 Broadway, Room 803, New York City..... May 1, 1889

CRAWFORD, JOSEPH EMMANUEL. Bridge Engr., Norfolk & West. Ry., Roanoke, Va..... Dec. 5, 1899

CRAWLEY, ERNEST WILLARD. Junior Engr., U. S. Engr. Dept., 305 Exchange Bldg. (Res., 345 Whalley Ave.), New Haven, Conn.... May 31, 1904

CROOK, JOHN ANTHONY. Secy. and Chf. Engr. for The John Gilligan Co.; City Engr., Falls City, Nebr..... Feb. 3, 1903

DARROW, MARIUS SCHOONMAKER. Asst. Engr., Bridge Dept. of C., B. & Q. Ry., 209 Adams St., Room 62, Chicago, Ill..... Feb. 6, 1900

DAVIES, WILLIAM GOMER. Care, U. S. Geological Survey, Boise, Idaho ..... Feb. 2, 1904

DAVIS, GEORGE JACOB, Jr. Asst. Engr., City Engr.'s Office, Grand Rapids, Mich..... Nov. 4, 1902

DAY, ARTHUR MORTIMER. 33 West 12th St., New York City..... May 1, 1900

DECKER, JOHN HULL. Supt. and Engr., Atlantic City Sewerage Co., 231 Bartlett Bldg., Atlantic City, N. J..... Sept. 6, 1904

DE LA MORA, MANUEL. Civ. Engr. and Archt., 17½ Sn. Francisco St., Guadalajara, Jalisco, Mexico..... Dec. 28, 1900

DIAMANT, ARTHUR HERBERT. Asst. Engr., Aqueduct Div., Aqueduct Commrs. (Res., 531 West 124th St.), New York City..... May 5, 1903

Date of Membership.

DICKE, EDWARD CHRISTIAN. Chf. Draftsman, Terminal R. R. Assoc., 210 Union Station, St. Louis, Mo. ..... May 3, 1904

DIMOND, JAMES RENWICK. 128 West 33d St., New York City..... Sept. 3, 1901

DOUGHERTY, RICHARD ERWIN. Asst. Engr., N. Y. C. & H. R. R. R., Room 700, Grand Central Station (Res., 244 West 20th St.), New York City..... Jan. 6, 1903

DUDLEY, CHARLES TARBELL. Draftsman to Chf. Engr., Bay Cities Water Co., 1010 Mutual Bank Bldg., San Francisco, Cal..... Sept. 6, 1904

DULLER, DAVID MARK. Chf. Engr. for Am. Rice Cereal Co. of Kansas City, Mo., 325 Commercial National Bank, Houston, Tex..... Oct. 6, 1903

DUNNELLS, CLIFFORD GEORGE. Designing Engr., Am. Bridge Co., 802 Frick Bldg., Pittsburg, Pa..... Feb. 4, 1902

DUSENBERRY, WALTER LORTON. 220 Tenth St., South Brooklyn, N. Y. Nov. 5, 1890

EDWARDS, DEAN GRAY. 430 West 118th St., New York City ..... Nov. 1, 1904

EDWARDS, OLIVER CROMWELL, Jr. Forbes Ave. and 9th St., Rensselaer, N. Y..... Oct. 7, 1902

EITZEN, ARTHUR ROBERT. Columbia, Mo..... Sept. 6, 1904

ELY, JOHN ANDREWS, Jr. 21 East 55th St., New York City..... April 30, 1901

ENOS, GEORGE WALLACE. Address unknown..... Mar. 6, 1900

ENZIAN, CHARLES. Dist. Engr., L. V. Coal Co., 366 So. River St., Wilkesbarre, Pa..... Sept. 3, 1901

FALK, MYRON SAMUEL. Instr. in Civ. Eng., Columbia Univ. (Res., 44 West 53d St.), New York City..... Feb. 4, 1902

FAUCETTE, WILLIAM DOLLISON. Asst. Engr., S. A. L. Ry., Union Station Bldg., Savannah, Ga..... Jan. 6, 1903

FERNOW, ROSSITER RAYMOND. Asst. Engr., Board of Public Works, 1427 North Front St., Harrisburg, Pa..... Mar. 3, 1903

FERRADAS, RAMIRO FRANCISCO ANTONIO. Care Hering & Fuller, 170 Broadway, New York City..... Jan. 3, 1905

FIRTH, ELMER WALLACE. Asst. Engr., Topographical Bureau, Borough of Queens, New York City ..... Jan. 7, 1896

FISCHER, GUILLERMO GUSTAVO. Trinidad, Provincia de Santa Clara, Cuba..... Feb. 2, 1904

FISHER, WAGER. Contr. Engr., 1420 Chestnut St., Philadelphia, Pa... Oct. 3, 1899

FORBES, HENRY DE BRETTON. Engr., H. E. Talbott & Co., College Hill, Ky..... Dec. 4, 1900

FOSS, JOHN HARRISON. Engr., Hamakua Ditch, Paia, Maui, Hawaii.. Dec. 1, 1903

FOX, CHARLES LOUIS. Asst. Engr., Pennsylvania Water Co., 701 Wood St., Wilkinsburg, Pa..... May 5, 1903

FOX, HENRY HEYWOOD. 55 Pineapple St., Brooklyn, N. Y..... Sept. 6, 1904

FUJINO, SHUKICHI. Nippon Tetsudo Kwaisha, Tokyo, Japan..... Feb. 3, 1903

FURMAN, JOB ROCKFIELD. Engr., Otis Elevator Co., 71 Broadway, New York City..... July 2, 1890

Date of Membership.

GAST, E. ALBERT. With Board of Trustees "Commrs. of Water-Works," Cincinnati, Ohio..... Oct. 6, 1903

GAY, ROBERT WALTER. Instr. in Civ. Eng., Lehigh Univ., South Bethlehem, Pa..... Oct. 6, 1903

GEORGE, HUGH MELVIN. Laurel, Miss..... Feb. 3, 1903

GETCHELL, WILLIAM STEWART. Asst. Engr., C. F. & I. Co., 816 Boston Bldg., Denver, Colo..... Sept. 2, 1902

GILMAN, CHARLES. 430 West 118th St., New York City..... Dec. 6, 1904

GILMAN, CHARLES EDWARD. Asst. Engr., Bay Cities Water Co., 1010 Mutual Savings Bank Bldg., San Francisco, Cal..... Oct. 6, 1903

GODDARD, HERBERT WILLARD. Technology Club, 36 East 28th St., New York City..... Jan. 3, 1905

GOODRICH, ERNEST PAYSON. Chf. Engr., Bush Cos., 117 Pearl St., New York City..... April 3, 1900

GOODRIDGE, JOHN WESLEY. Asst. Engr., Rapid Transit R. R. Commrs. (5th Div.), New York City (Res., 292 Marlborough Rd., Brooklyn, N. Y.)..... Oct. 4, 1898

GORDON, JOHN BLAKE. 6 Cooke Pl., N. W., Washington, D. C..... Dec. 1, 1903

GOULD, JOHN WARREN DU BOIS. Corps of Engrs., National Board of Fire Underwriters, 135 William St., New York City..... Oct. 7, 1902

GRAY, JOHN COLIN. Asst. Engr., Bureau of Highways, Room 19, Municipal Bldg., Brooklyn, N. Y..... June 4, 1901

GREENLAW, RALPH WELLER. Asst. Engr., 3d Div., Rapid Transit R. R. Comm., 231 West 125th St., New York City..... May 3, 1904

GREENSFELDER, ALBERT PRESTON. Asst. Engr., Terminal R. R. Assoc. of St. Louis, 206 Union Station, St. Louis, Mo..... May 3, 1904

GRIMM, HENRY ENGLAND. 3213 Eads Ave., St. Louis, Mo..... Oct. 2, 1900

GRISWOLD, HARRY TODD. 67 West 38th St., New York City..... Oct. 6, 1903

GUGERTY, EDWARD JOSEPH. 54 East 124th St., New York City..... May 3, 1904

HAEHL, HARRY LEWIS. Asst. Engr., Bay Cities Water Co., Coyote, Cal..... Oct. 6, 1903

HALE, HERBERT MILLER. 430 West 118th St., New York City..... Nov. 1, 1904

HALL, CHARLES WARD. Address unknown..... Sept. 6, 1898

HALL, MARTIN WELCH. Bureau of Highways, Borough of the Bronx, New York City..... Oct. 1, 1901

HALL, ROBERT ELLIOT. Insp., Care, Syracuse R. R. Cons. Co., Lyons, N. Y..... Sept. 6, 1904

HAMILL, ALEXANDER, Jr. Jersey City, N. J..... Dec. 28, 1900

HAMLIN, RALPH. Steel Designer with International Paper Co., 30 Broad St., New York City..... Jan. 5, 1904

HAMMER, ROBERT HENRY. 205 Congress St., Brooklyn, N. Y..... Jan. 7, 1902

HANAVAN, WILLIAM LAWRENCE. 430 West 118th St., New York City... Dec. 6, 1904

HANCOCK, HENRY SYDNEY, Jr. Care, Div. Engr., G. T. P. Ry., P. O. Box 68, Winnipeg, Man., Canada..... Oct. 6, 1903

HANEY, LEWIS TUSTLER. 369 Ocean Ave., Brooklyn, N. Y..... Oct. 7, 1902

Date of Membership.

HANNA, WALTER SCOTT. 213 S. Fifth St., Wilmington, N. C..... Oct. 6, 1903

HARDING, WILLIAM STEWART. Bituminous Coal Operator, Arcade Bldg. (Res., 3411 Hamilton St.), Philadelphia, Pa..... Nov. 3, 1896

HARPS, HARRY MACY. Nantucket, Mass..... Mar. 3, 1903

HARRINGTON, FRANCIS BURCHARD. Asst. Supt. of Signals, Mohawk Div., N. Y. C. & H. R. R. R. Co., 93 Ten Broeck St., Albany, N. Y..... Sept. 11, 1900

HARRINGTON, HARRY GARFIELD. Eng. Dept., The New Jersey Zinc Co., 71 Broadway, New York City..... Jan. 7, 1902

HARRIS, HENRY ALEXANDER. 245 Nassau St., Princeton, N. J..... Oct. 31, 1899

HARSHBARGER, ELMER DWIGHT. Aspinwall, Pa..... Nov. 5, 1901

HARWI, SOLOMON JACOB. Civ. Engr. for The Babcock & Wilcox Co., New York City (Res., 910 Ave. C, Bayonne, N. J.)..... Dec. 4, 1889

HASELTON, GAGE. 375 Taylor St., Portland, Ore..... May 3, 1904

HAUSMAN, FREDERICK APPEL. 514 Union St., Allentown, Pa..... Feb. 3, 1903

HAWKESWORTH, JOHN. Asst. Engr. with R. F. Almirall, Archt., 51 Chambers St. (Res., 100 West 80th St.), New York City..... Sept. 6, 1904

HAWKS, ARCHIE MCLEAN. Cons. Engr., 402 Berlin Bldg., Tacoma, Wash..... Nov. 2, 1887

HAYDEN, EDWIN CLAPP. 16 City Sq., Room 4, Charlestown, Mass..... Oct. 1, 1901

HEALD, EDWARD CRESWELL. 1720 N St., Washington, D. C..... Oct. 7, 1902

HENLEY, ROBERT DWIGGINS MONTEITH. Asst. Engr., L. & N. R. R., Pensacola, Fla..... Sept. 3, 1901

HIGGINSON, JONATHAN YATES. Care, Holbrook, Cabot & Rollins Corp., Bridgeport, Conn..... Oct. 1, 1901

HILDER, FRAZER CROSWELL. Surv.'s Office, City Hall, Washington, D. C..... Sept. 6, 1904

HILL, STIRLING BRYANT. 1633 Bellevue Ave., Seattle, Wash..... Oct. 7, 1902

HOGAN, JOHN PHILIP. 430 West 118th St., New York City..... Dec. 6, 1904

HOLMES, EDWIN MERRITT. Engr., Spanish Am. Iron Co., Daiquiri, Cuba..... Mar. 31, 1903

HOOD, JOHN MIFFLIN, Jr. 1231 N. Calvert St., Baltimore, Md..... May 31, 1904

HOPPER, JOHN JACOB. Civ. Engr. and Contr., 215 West 125th St., New York City..... May 5, 1886

HORTON, ALBERT HOWARD. Care, U. S. Geological Survey, Washington, D. C..... June 3, 1902

HORTON, SANDFORD. 54 West 129th St., New York City..... Feb. 7, 1877

HOW, RICHARD WILLIS. Chf. Insp. (Bridge Engr.'s Office), Long Island R. R., 5 Hanson Pl., Brooklyn, N. Y..... June 6, 1899

HOWARD, CLEMENT JOHN. Rodman, G. C. & S. F. Ry., Care, Chf. Engr., Santa Fe Ry., Galveston, Tex..... Sept. 6, 1904

HOWARD, ERNEST EMMANUEL. Asst. Engr., Waddell & Hedrick, 608 New Nelson Bldg., Kansas City, Mo..... Dec. 3, 1901

HOWE, CHARLES EDWARD. Treas., Wabash Mfg. Co., Wabash, Ind... Mar. 6, 1900

HOWE, HARRY NORTHROP. U. S. Engr. Office (Box 204), Memphis, Tenn..... Dec. 6, 1904

HOWES, RALPH HOLT. Civ. Engr. and Supt., Const., Wells Bros. Co. of N. Y., The Snowden, Syracuse, N. Y..... Feb. 2, 1904

Date of Membership.

HOYT, HENRY PEREZ. Asst. Engr., Great Northern Paper Co., Millinocket, Me ..... Oct. 6, 1903

HULSE, SHIRLEY CLARKE. Clinton Hotel, Ithaca, N. Y. ..... Oct. 7, 1902

HUNTER, LEROY LITTLEFIELD. Eng. Dept., Penn. Lines W. of Pitts., 1013 Penn Ave., Pittsburg, Pa ..... Jan. 5, 1904

HUNTING, EUGENE NATHAN. Concrete Steel Engr., 609 House Bldg., Pittsburg, Pa ..... Nov. 1, 1904

HUTCHINGS, JOHN BACON, Jr. 1562 Barrett Ave., Louisville, Ky ..... Sept. 6, 1904

HYATT, CALEB. 515 Lexington Ave., New York City ..... Mar. 3, 1903

IRELAND, MARK LORIN. 2d Lieut., 11th U. S. Infantry, Fort D. A. Russell, Wyo ..... Oct. 6, 1903

IVES, HOWARD CHAPIN. Asst. Prof. of Civ. Eng., Univ. of Pennsylvania, Philadelphia, Pa ..... Dec. 3, 1901

JABELONSKY, CARL HUGO. Eng. Dept., J. B. & J. M. Cornell Co. Iron Works and Foundry, 26th St. and 11th Ave., New York City .. Sept. 1, 1903

JOHNSON, LUTHER ELMAN. Box 592, Lawton, Okla ..... Sept. 6, 1904

JORDAN, WILLIS ROBERT. Bangor, Pa ..... Oct. 6, 1903

KAHN GUSTAVE EDMUND. Supt. of Constr., The Fire & Rust Proof Constr. Co. (Res., 350 Greenbush St.), Milwaukee, Wis ..... Sept. 6, 1904

KAST, CLARKE NIGHTINGALE. Asst. Engr., Rock Island System, Little Rock, Ark ..... June 4, 1901

KAUFFMAN, VERNET ALBERT. Transitman, Denver, N. W. & Pac. Ry.; Address, Care, H. A. Sumner, Chf. Engr., Denver, Colo ..... Feb. 3, 1903

KELLY, OLAF MORROGH. Asst. Engr., Williamsburgh Bridge, 84 Broadway, Brooklyn, N. Y ..... Dec. 6, 1898

KEMPKEY, AUGUSTUS, Jr. 980 Sixth Ave., Oakland, Alameda Co., Cal. Mar. 31, 1903

KIBBE, AUGUSTUS SAYRE. Chf. Engr., The Am. Rys. Co., 905 Witherspoon Bldg., Philadelphia, Pa ..... Mar. 6, 1889

KIMBALL, RALPH CHARLES. Address unknown ..... Oct. 7, 1902

KLEINSCHMIDT, HENRY SCHWING. Eng. Aid, Reclamation Service, U. S. Geological Survey, Box S, Salt Lake City, Utah ..... Mar. 1, 1904

KOLB, HENRY JACOB. Chf. Draftsman, Office, Engr., Way and Structures, Brooklyn Heights R. R., 166 Montague St., Brooklyn, N. Y ..... Feb. 3, 1903

LAMBIE, CHARLES SUMNER. 7 Cliff St., Pittsburg, Pa ..... Oct. 1, 1901

LANT, FRANK PARSONS. 21 Park Row, Room 1838, New York City .... Oct. 3, 1888

LAYNG, FRANK RAHN SHUNK. Asst. Engr., B. & L. E. R. R., Greenville, Pa ..... April 1, 1902

LEAKE, BOUDINOT GAGE. Asst. Engr., C., R. I. & G. Ry., Fort Worth, Tex ..... Jan. 5, 1904

LEE, GEORGE WILLIAM. Engr. for Sundstrom & Stratton, Contrs., 143 Liberty St., New York City ..... Mar. 4, 1902

Date of Membership

LILLICH, JOSEPH THOMAS. With Charles H. Ledlie, Cons. Engr., 918 Rialto Bldg., St. Louis, Mo. ..... Nov. 3, 1903

LINDSEY, KIEFFER. Asst. Engr., Dept. of State Engr. and Surv., "Weigh Lock," Syracuse, N. Y. ..... Oct. 7, 1902

LINDSLEY, THAYER. 157 West 47th St., New York City ..... Jan. 3, 1905

LUDLOW, JUSTIN WYMAN. Designing Draftsman, Bridge Dept., C., B. & Q. Ry., 209 Adams St., Chicago, Ill. ..... April 5, 1904

MACDONALD, HARRY PEAKE. Shop Supt., The Snead & Co. Iron Works, Jersey City, N. J. ..... Oct. 7, 1902

MCBURNEY, HENRY. Draftsman, Am. Bridge Co., 1409 Locust St., Philadelphia, Pa. ..... Jan. 5, 1904

MCCORNACK, CLYDE WEBSTER. Phœnixville, Pa ..... Jan. 31, 1905

MCCRORY, SOL. With the Asst. Signal Engr. of the Santa Fe System, Cleburne, Tex. ..... Oct. 6, 1903

MCHARG, LESLIE. 159 Madison Ave., New York City ..... Mar. 5, 1901

MCINTIRE, THOMAS BURTON. 1011 East 156th St., New York City ..... Mar. 1, 1904

MCKEEVER, WILLIAM. Address unknown ..... Jan. 2, 1900

MAGRUDER, FRANK CECIL. Asst. Engr., U. S. Geological Survey, Chamber of Commerce Bldg., Denver, Colo. ..... Sept. 6, 1904

MANSFIELD, ROYAL JOHN. Asst. Engr. in Chg., Building Work, Wellman-Seaver-Morgan Co., Cleveland, Ohio ..... Dec. 2, 1902

MATHESON, JOHN DOUGLAS. Terminal Engr.'s Office, N. Y. C. & H. R. R. R., Grand Central Palace, 43d St. and Lexington Ave., New York City ..... Mar. 3, 1903

MAYELL, ALBERT JEFFERSON. Asst. Engr. with R. T. Comm., Office of 4th Div., 231 West 125th St. (Res., 550 East 164th St.), New York City ..... Mar. 1, 1904

MELICK, NEAL ALBERT. Asst. Engr., N. Y. C. & H. R. R. R. (Res., 16 West 128th St.), New York City ..... Dec. 2, 1902

MELIUS, LUDLOW LAWRENCE. 30 South Hawk St., Albany, N. Y. ..... May 2, 1899

MERRILL, ROBERT HALL. U. S. Junior Engr., 166 Summer St., Grand Rapids, Mich ..... May 3, 1904

MERRIMAN, THADDEUS. Div. Engr., Jersey City Water Supply Co., 158 Ellison St., Paterson, N. J. ..... April 4, 1899

MERZ, LEON. 1730 Memorial Ave., Philadelphia, Pa. ..... Mar. 5, 1901

MEYERS, CLARENCE WILLIAM. 314 Riverside Drive, New York City ..... Sept. 1, 1903

MILLARD, CURTISS. Pres., Peoria & Pekin Union Ry., Peoria, Ill. ..... April 3, 1889

MILLER, STANLEY ALFRED. Asst. Engr., S. Pearson & Son, Ltd., Coatzacoalcos, V. C., Mexico ..... Feb. 4, 1902

MINER, JAMES HENRY. Asst. Engr., U. S. Reclamation Service, Montrose, Colo ..... Mar. 31, 1903

MINOR, EDWARD EASTMAN. 493 Edgewood Ave., New Haven, Conn ..... May 1, 1900

MOORE, EGBERT JESSUP. Engr., S. Pearson & Son, Inc., Contrs., Long Island City (Res., 137 West 90th St.), New York City ..... Mar. 31, 1903

MORE, CHARLES CHURCH. Asst. Prof., Civ. Eng., Univ. of Washington, Seattle, Wash ..... May 2, 1899

Date of Membership.

MORPHY, LUIS GONZAGA. Asst. Engr. of Grade Crossing Eliminations, N. Y. C. & H. R. R. R. Co., Room 700, Grand Central Station, New York City ..... Feb. 4, 1902

MURRAY, RAY. Asst. to Chf. Engr., Am. Bridge Co. of N. Y., Ambridge, Pa. ..... Oct. 6, 1903

MYERS, CHESTER JOHN. Care, Water Dept., Atlantic City, N. J. ..... Oct. 1, 1901

NEAL, CLARENCE ADKINS. Draftsman with Kansas City Park Board, 318 Waldron Ave., Kansas City, Mo ..... Dec. 6, 1904

NELSON, ALEXANDER HOWARD. 200 Lewis Bldg., Pittsburg, Pa. ..... Nov. 1, 1898

NUTTER, CHARLES HERBERT. Asst. Engr., Manhattan Ry. Div., I. R. T. Co. (Res., 101 West 106th St.), New York City ..... Feb. 5, 1901

NYE, ALGERNON SIDNEY. Asst. Engr. to the Aqueduct Commrs., Kingsbridge, New York City ..... July 2, 1890

OAKLEY, GEORGE ISRAEL. Transitman and Computer, Topographical Bureau, Borough of Queens, East Williston, Nassau Co., N. Y. Oct. 6, 1903

O'CONNOR, CORNELIUS JOSEPH. 1799 Washington Ave., Bronx, New York City ..... Mar. 1, 1904

ORTIZ, EDUARDO. Coliseo Viejo No. 6, P. O. Box 2020, City of Mexico, Mexico ..... Nov. 4, 1902

PAINE, GEORGE HEBARD. Cons. Engr., 150 Nassau St., New York City ..... Nov. 5, 1890

PARASCHOS, GEORGE THEOPHANES. Dept. of Public Works, Bureau of Filtration, Pittsburg, Pa. ..... Nov. 4, 1902

PARKER, ASA WARREN. 45 Broadway, New York City ..... Sept. 11, 1900

PARKER, JOHN CASTLEREAGH. Asst. to Engr. in Chg., Ontario Power Co., 244 Fifth Ave., Niagara Falls, N. Y. ..... Dec. 6, 1904

PARKER, RICHARD DENNY. Res. Engr., Houston, East & West Tex. Ry. and Houston & Shreveport R. R., Houston, Tex. ..... June 3, 1902

PEARSE, LANGDON. Draftsman, Water Purification and Sewage Disposal, Care, Board of Public Service, Columbus, Ohio. ..... Jan. 6, 1903

PERRY, JOHN PRINCE HAZEN. Asst. Engr., L. I. R. R., Cor., Van Wyck Ave. and Beaufort St., Jamaica, N. Y. ..... Nov. 1, 1904

PHILLIPS, WILLIAM HALE. 2430 Bancroft Way, Berkeley, Cal ..... Nov. 1, 1904

PILLET, FREDERICK FISCHER. Care, Board of Public Works, Mobile, Ala. ..... June 2, 1903

PISTOR, GEORGE EMIL JOHN. Designing Engr., Hay Foundry & Iron Works, Newark, N. J. ..... Dec. 3, 1901

PLOGSTED, WALTER JOHN. Asst. Engr. with Sanderson & Porter, 323 Baronne St., New Orleans, La. ..... Oct. 6, 1903

POLK, ARMOUR CANTRELL. Asst. Engr., Conduit Constr. (Sanderson & Porter), 323 Baronne St., New Orleans, La. ..... Oct. 6, 1903

PORTER, JOHN ENDICOTT. Transitman, N. Y. C. & H. R. R. R., Vilas, Pa. ..... Sept. 1, 1903

POTTS, CLYDE. Civ. and San. Engr., 902 Whitehall Bldg., New York City ..... Dec. 3, 1901

Date of Membership.

PRICE, PHILIP WALLIS. Transitman, U. S. Geological Survey, 426 Peyton Blk., Spokane, Wash ..... April 2, 1901

PROCTOR, RALPH FENNO. Civ. and San. Engr. with Williams & Whitman, 902 Whitehall Bldg., New York City ..... June 3, 1902

QUANZ, RUDOLPH. 40 Howard Ave., Brooklyn, N. Y. ..... Sept. 2, 1902

RASTER, WALTHER. With E. C. & R. M. Shankland, The Rookery, Chicago, Ill ..... Feb. 4, 1902

RAY, DAVID HEYDORN. Archt. and Engr. (Mem. Examining Board, Civ. Service Comm.), 555 West 182d St., New York City ..... Oct. 7, 1902

REED, WILLIAM BELDEN, Jr. Gen. Mgr., White Mfg. Co., 556 West 34th St., New York City ..... Dec. 1, 1896

RHEA, WILLIAM DOUGLAS. Mgr., National Fertilizer Co.; Pres., Stony Creek Sulphur Co., Nashville, Tenn ..... Oct. 4, 1898

RHETT, EDMUND MOORE. 430 Frick Bldg., Pittsburg, Pa. ..... Nov. 4, 1902

RICHARDSON, CLINTON LEROY. 544 Equitable Bldg., Atlanta, Ga. ..... Sept. 2, 1902

RICHARDSON, JOHN FRANCIS. First Asst. Engr., Water, Sewerage and Water Board, 602 Carondelet St., New Orleans, La. ..... Oct. 3, 1899

RICHMOND, JULIAN PIERRE WILLIAM. With Rapid Transit R. R. Comm., Chf. Engr.'s Office, 320 Broadway (Res., 1144 Tinton Ave.), New York City ..... Feb. 2, 1904

RIEDEL, ARTHUR EMIL. Union Square Hotel, New York City ..... Nov. 5, 1901

ROBERTS, ALFRED WHEELER. 411 Fairmount Ave., Jersey City, N. J. . April 5, 1904

ROBERTS, HARRY ASHTON. Asst. Engr., O. S. L. R. R., Pocatello, Idaho. April 5, 1904

ROBINSON, GEORGE LOOMIS. 32 Broadway, New York City ..... April 5, 1904

ROHNERT, BENNO. 85 Champlain St., Detroit, Mich. ..... April 3, 1889

ROOT, WILLIAM STANTON. Terminal Engr.'s Office, N. Y. C. & H. R. R. R., New York City (Res., Orchard Cliff, Westchester Co., N. Y.) ..... Oct. 6, 1903

RYAN, MICHAEL HEALEY. Asst. Engr., N. Y. Rapid Transit Comm., 231 West 125th St., New York City ..... Dec. 3, 1901

RYDER, ELY MORGAN TALCOTT. Instr. in Civ. Eng., Sheffield Scientific School of Yale Univ., P. O. Box 671, Yale Station, New Haven, Conn. ..... Jan. 5, 1897

SABIN, RALPH HARVEY. Pomfret, Conn. ..... Oct. 7, 1902

SACKETT, ARTHUR JOHNSON. U. S. Insp., U. S. Engr. Office, Miami, Fla. Mar. 1, 1904

SAUCEDO, VICENTE. 2a Hidalgo No. 37, Saltillo, Coah., Mexico. ..... Oct. 6, 1903

SAUER, ALFRED FRANCIS. Draftsman, C. R. R. of N. J., Central Bldg., New York City (Res., 1158 East Jersey St., Elizabeth, N. J.). ... Sept. 1, 1903

SAWYER, WILBUR CYRUS. Asst. Engr., U. S. Geological Survey, Reclamation Service, Pendleton, Ore. ..... Oct. 6, 1903

SAYERS, EDWARD LAWRENCE. Care, P., N. Y. & L. I. R. R., 1 West 34th St., New York City ..... Feb. 2, 1904

Date of Membership.

SCHMID, FRANCIS RAUCH. With Hay Foundry & Iron Works, Newark, N. J.; Address, 30 Wall Street, Bethlehem, Pa..... Oct. 6, 1903

SCHMITT, JACOB. Bureau of Highways, Municipal Bldg., Brooklyn, N. Y..... June 2, 1903

SCHODER, ERNEST WILLIAM. Engr. in Chg. of Hydr. Laboratory, Cornell Univ., 410 E. Yates St., Ithaca, N. Y..... Oct. 1, 1901

SCHUMANN, CARL JULIUS. With The United Eng. & Contr. Co., 13 Park Row, New York City..... Dec. 2, 1902

SCOTT, GUY. Asst. Engr., Penn. Lines W. of Pitts., Cleveland and Pittsburgh Div., Box 331, Wellsville, Ohio..... Dec. 1, 1903

SEABURY, GEORGE TILLEY. Engr. on Riverside Drive Extension, Sections 3 and 4, 1909 Amsterdam Ave. (Res., 475 West 159th St.), New York City..... Mar. 31, 1903

SELBY, OSCAR ELLSWORTH. Asst. Engr., C., C., C. & St. L. Ry., Cincinnati, Ohio..... Mar. 4, 1891

SENIOR, FRANK SEARS. Engr. with McMullen & McDermott, Havre de Grace, Md..... Feb. 28, 1899

SHELLEY, OSWALD PROCTER. Cornwall, Contra Costa Co., Cal..... April 5, 1904

SHERWOOD, FREDERICK AUGUSTUS. Drawer O, Deadwood, S. Dak..... Oct. 6, 1903

SHRYOCK, JOSEPH GRUNDY. Eng. Dept., Belmont Iron Works, Philadelphia, Pa..... April 2, 1901

SINNICKSON, GEORGE ROSENGARTEN. Supervisor, P. R. R., Dravosburg, Allegheny Co., Pa..... Sept. 5, 1899

SLOCUM, CURLYS LYON. Room 301, R. R. Bldg., New Haven, Conn... Jan. 3, 1905

SMALL, JAMES HAMPDEN, Jr. 527 West 124th St., New York City... Mar. 31, 1903

SMITH, CHARLES HORTON. County Engr. of Orange County, Middletown, N. Y..... June 4, 1890

SMITH, GEORGE EDSON PHILIP. Prof. of Eng., Univ. of Arizona, Tucson, Ariz..... Feb. 3, 1903

SMITH, MARION DEKALB, Jr. 6 Washington Ave., Chestertown, Md... Oct. 1, 1901

SMITH, MERRITT HAVILAND. Engr., Finance Dept., 280 Broadway, Room 52, New York City (Res., 1 Overlook Terrace, Yonkers, N. Y.)..... June 5, 1889

SMITH, TRAVIS LOGAN, Jr. City Engr., Eagle Lake, Tex..... Feb. 3, 1903

SNYDER, CHARLES HERMAN. City Engr., Oswego, N. Y..... Oct. 7, 1902

SPALDING, WALTER JAMES. Engineering Aid, Reclamation Service, U. S. Geological Survey, Box S, Salt Lake City, Utah..... Nov. 1, 1904

SPEIDEL, HUGO S. Pres., The David Henry Bldg. Co., Cor., Main and Smith Sts., Paterson, N. J..... Feb. 5, 1890

SPENCER, HERBERT. Fulton, N. Y..... Feb. 2, 1904

SPENCER, LOUIS BERNARD. Cons. Engr., Ogden, Utah..... Oct. 31, 1899

SPRAGUE, EDWIN LORING, Jr. 231 West 125th St., New York City.... May 31, 1904

STARR, WILLIAM H. Address unknown..... April 2, 1884

STEPATH, CHARLES UNDERHILL. 154 West 122d St., New York City... Feb. 3, 1903

STEPHENSON, STUART AUGUSTUS, Jr. Eng. Dept., P. R. R. Co., Office of Asst. Engr. of Constr., Newark, N. J..... Jan. 3, 1905

STEWART, WILLIAM JAMES. First Asst. City Engr., Rochester, N. Y.... May 7, 1890

Date of Membership.

Stiger, John Sharp, Jr. Bernardsville, N. J. ..... Oct. 2, 1900

Stratton, Charles Heywood. Sub-Insp., Dept. of Bldgs. and Grounds, U. S. Naval Academy, 195 Hanover St., Annapolis, Md. ..... Oct. 6, 1903

Sussex, James Wolfe. Abingdon, Ill. ..... Oct. 6, 1903

Sutton, Charles Wood. Cuerpo de Ingenieros de Minas, Lima, Peru. Dec. 1, 1903

Swaty, David Youngs. Asst. Engr., Penn. Lines W. of Pitts., South West System, Union Station, Pittsburg, Pa. ..... Oct. 6, 1903

Taft, Jesse Russell. Asst. Engr., N. Y. C. & H. R. R. R., 23 East 48th St., New York City ..... June 2, 1903

Talbot, Earle. Care, Union Trust Co. of San Francisco, San Francisco, Cal. ..... Nov. 1, 1904

Tappan, Roger. Care, Baring Bros. & Co., Ltd., 8 Bishopsgate St., Within, London, E. C., England ..... Dec. 3, 1884

Tatlock, James Lloyd. Asst. Engr., Sewer Comm., City Hall, New Rochelle, N. Y. ..... Sept. 1, 1903

Taylor, Alexander Jenifer. Park Engr., Wilmington, Del. ..... Oct. 3, 1899

Taylor, Howard Flanders. 800 Brighton Ave., Kansas City, Mo. .... Feb. 28, 1899

Taylor, Norman Alfred. State Road Engr., Dept. of State Engr. and Surv., State Hall, Albany (Res., 603 Grand St., Troy), N. Y. Oct. 6, 1903

Taylor, William Purves. Engr. of Tests, Philadelphia Municipal Testing Laboratories, 318 City Hall, Philadelphia, Pa. ..... Oct. 7, 1902

Thompson, Wilford Ashford. Prin. Asst. City Engr. (Res., 428 Columbia Pl.), East St. Louis, Ill. ..... Oct. 1, 1901

Toensfeldt, Hans Carl Thomas. Structural Engr., Board of Education, Board of Education Bldg. (Res., 3117 Longfellow Boulevard), St. Louis, Mo. ..... April 1, 1902

Tombo, Carl. Asst. Engr., M. of W. Dept., N. Y. C. & H. R. R. R. (Res., 273 West 138th St.), New York City ..... Feb. 3, 1903

Towne, Joseph Minott. Gen. Agt., Safety Car Heating & Lighting Co., 160 Broadway, New York City ..... Dec. 5, 1899

True, Albert Lyman. Junior Engr., U. S. Engr. Office, Fort Williams, Cape Cottage, Me ..... Sept. 2, 1902

Tunstall, Whitmell Pugh. With The Thompson-Starrett Co., 1706 Nineteenth St., N. W., Washington, D. C. ..... Oct. 6, 1903

Ullmann, John George. 26 Stewart Ave., Buffalo, N. Y. ..... April 1, 1902

Underwood, Howard Warren. First Asst. Engr., Bureau of Filtration, Pittsburg (Res., 100 Center Ave., Aspinwall), Pa. .... Dec. 3, 1901

Van Brakle, John Ogden. Dept. of Docks and Ferries, Pier A, North River, New York City ..... Mar. 5, 1901

Van Suetendael, Achille Octave. Yonkers, N. Y. ..... Jan. 3, 1905

Van Zile, Harry Lee. 410 West End Ave., New York City ..... Jan. 6, 1886

Veuve, Erle Leroy. Asst. Engr., Pacific Elec. Ry. Co. and Los Angeles Inter-Urban Ry. Co., Los Angeles, Cal. ..... Sept. 3, 1901

Date of Membership.

WAITE, DONALD CRAMER. 17 Greenvale Ave., Yonkers, N. Y..... Jan. 3, 1905

WALKER, EDWARD LLOYD. Care, Committee of Twenty of National Board of Fire Underwriters, 135 William St., New York City.... Feb. 3, 1903

WALKER, GEORGE JOHNSON. Draftsman with Am. Bridge Co., 316 Thorn St., Sewickley, Pa..... Dec. 6, 1904

WALTERS, HENRY RADCLYFFE ST. ARVANS. Prin. Asst. Engr. and Chf. Draftsman, Guerber Eng. Co., (Res., 211 S. New St.), Bethlehem, Pa..... Oct. 6, 1903

WARD, CHARLES ROYCE. Asst. Engr., Dept. of Highways, Brooklyn, N. Y..... Dec. 1, 1896

WARNER, GEORGE LITTLETON. Asst. Engr., Reclamation Service, U. S. Geological Survey, Lawton, Okla..... April 1, 1902

WAUGH, WILLIAM HAMMOND. Chf. Engr., Shenango Traction Co., Greenville, Pa..... Oct. 1, 1901

WEAVER, FRANK MAURICE. Asst. Engr., Subway and Elev. Ry. Constr., Phil. Rap. Trans. Co., 9th and Dauphin Sts., Philadelphia, Pa.. Nov. 4, 1902

WEBSTER, ROYAL SYLVESTER. Chf. Clerk, Engr. Dept., Chihuahua & Pacific R. R., Apartado 46, Chihuahua, Mexico..... Oct. 6, 1903

WELLER, FRANCIS REPETTI. Associated with Henry A. Pressey, Civ. and Hydr. Engr., 1416 F St., N. W., Washington, D. C..... Feb. 5, 1901

WELLS, CLINTON GLENCAIRN. City Engr. for Galveston, Tex.; Chf. Engr., Galveston & Western R. R.; Address, City Hall, Galveston, Tex. Mar. 5, 1901

WELTON, BENJAMIN FRANKLIN. Examining Engr., Commrs. of Accounts, New York City (Res., 1 Wiener Pl., Tompkinsville, N. Y.)..... April 6, 1897

WENIGE, ARTHUR EMIL. Asst. Engr., Bureau of Sewers, Borough of Brooklyn, New York City..... May 6, 1902

WESTOVER, HENRY CHRISTOPHER. 1313 Felix St., St. Joseph, Mo..... Nov. 1, 1904

WHITBECK, LEE FIELD. Care, Rankin Johnson, Durango, Dgo., Mexico. Dec. 6, 1904

WHITMAN, EZRA BAILEY. (Williams & Whitman), 902 Whitehall Bldg., Battery Pl., New York City..... Feb. 3, 1903

WHITNEY, THOMAS BRYAN, Jr. 19 West 38th St., New York City ..... Sept. 6, 1898

WHITSON, ABRAHAM UNDERHILL. Aspinwall, Pa..... Jan. 7, 1902

WHITTED, LEVI ROMULUS. Supt. of Constr., U. S. Public Bldgs., Rome, Ga..... Mar. 6, 1900

WICKERSHAM, JOHN HOUGH. Lancaster, Pa..... May 6, 1902

WIDDICOMBE, ROBERT ALEXANDER. Engr. and Supt., Kroeschell Bros. Co., 1651 Roscoe St., Chicago, Ill..... April 2, 1901

WILCOX, CLARK LUZERNE. 2d Asst. Engr., Bureau of Filtration, Pittsburg; Address, Aspinwall, Pa..... Dec. 3, 1901

WILCOX, FRANK LESLIE. Hotel Cameron, Cameron, Mo..... Sept. 6, 1904

WILDES, WALDO GILMAN. Asst. Engr., State Engr.'s Office, Weighlock Bldg., Syracuse, N. Y..... Feb. 3, 1903

WILHELM, JEROME FREDERICK. Traverse City, Mich..... Jan. 2, 1900

WILLIAMS, BENJAMIN LEE, Jr. Supt., The West Orange Water Co., 323 Valley Rd., West Orange, N. J..... Feb. 3, 1903

WILLIAMS, HOWARD SHAY. Eng. Dept., City Hall, Columbus, Ohio... Dec. 1, 1903

Date of Membership.

WILLIAMS, ROGER BUTLER, Jr. (Williams & Whitman), 902 Whitehall Bldg., Battery Pl., New York City..... Oct. 1, 1901

WILSON, WILLIAM EDWARD. Asst. Prof. of Civ. Eng., Univ. of Utah; Civ. and Cons. Engr. (Lyman & Wilson), 1115 Second St., Salt Lake City, Utah..... Jan. 6, 1903

WINCHESTER, PHILIP HAROLD. Asst. Engr., M. of W. Dept., N. Y. C. & H. R. R. R., 37 Ten Eyck St., Watertown, N. Y..... Jan. 7, 1902

WITHERELL, FREDERICK WHITEFIELD. Room 1200, Bank for Savings Bldg., Pittsburg, Pa..... Oct. 6, 1903

WOODCOCK, HENRY WRIGHT. Asst. Engr., Brooklyn Grade Crossing Comm., 361 Ocean Ave., Brooklyn, N. Y..... Dec. 1, 1903

WOOLLARD, GEORGE CLIFTON. Engr. and Supt., James Stewart & Co., 30 Elizabeth St., Hornellsville, N. Y..... April 3, 1900

WYCKOFF, CHARLES RAPELYEA, Jr. Am. Bridge Co., 7 West 22d St., New York City (Res., 185 Penn St., Brooklyn, N. Y)..... May 5, 1903

YATES, WILLIAM HENRY. Tutor in Civ. Eng., Columbia Univ., 309 West 128th St., New York City..... Feb. 2, 1904

YEN, TUCK CHING STRONG. Res. Engr., Canton-Hankow Ry., Canton, China..... Dec. 1, 1903

ZABRISKIE, AARON J. 23 Fifth Ave., New York City..... July 1, 1885

Juniors, 350.

FELLOWS.

[F. Am. Soc. C. E.]

	Date of Membership.
ADAMS, EDWARD DEAN. Banker, 71 Broadway, Offices 1414-15, New York City	Mar. 31, 1891
ALBRIGHT, JOHN JOSEPH. Buffalo, N. Y	April 20, 1886
BARBER, AMZI LORENZO. 17 Battery Pl., New York City	Mar. 19, 1886
BELKNAP, WILLIAM RICHARDSON. 115 West Main St., Louisville, Ky	May 28, 1872
BLATCHFORD, ELIPHALET W. 375 La Salle Ave., Chicago, Ill	Feb. 6, 1873
BOUTON, NATHANIEL S. Care, Kenwood Bridge Co., 614 First National Bank Bldg., Chicago, Ill	Dec. 30, 1872
CHANUTE, OCTAVE. (*Past-President*). Cons. Engr., 413 East Huron St., Chicago, Ill.	M. Feb. 19, 1868 F. July 11, 1872
CLARK, EDWARD WHITE. Bullitt Bldg., Philadelphia, Pa	April 8, 1870
COIT, EDWARD WOOLSEY. Address unknown	Sept. 20, 1872
COLEMAN, THOMAS COOPER. 252 West Main St., Louisville, Ky	May 28, 1872
COOPER, EDWARD. 17 Burling Slip, New York City	Dec. 10, 1885
DARWIN, HARRY GILBERT. Engr. in Chg. of San. Inspection, Hackensack Water Co., New Milford (Res., 84 Clinton Pl., Hackensack), N. J	Mar. 22, 1887
DU PONT, BIDERMAN. 808 Broome St., Wilmington, Del	Sept. 5, 1873
EVEREST, CHARLES MARVIN. 506 West Ave., Rochester, N. Y	Nov. 1, 1892
FARREN, B. N. Montague City, Mass	Mar. 12, 1870
FLINT, CHARLES R. Flint & Co., 30 Broad St. (Res., 4 East 36th St.), New York City	June 7, 1876
GREEN, SAMUEL MAGEE. R. R. Contr., 740 Wells Bldg., Milwaukee, Wis	Sept. 5, 1888
HILL, JAMES JEROME. Pres., G. N. Ry. Co., St. Paul, Minn	Jan. 10, 1889
HOLMAN, STEPHEN. 150 Atlantic Ave., Swampscott, Mass	June 29, 1872
KIDDLE, ALFRED WATTS. 314 West 98th St., New York City	Oct. 3, 1893

FELLOWS M–W

	Date of Membership.
Merritt, George. Address unknown	May 6, 1870
Meyer, Henry Coddington. Montclair, N. J	Oct. 22, 1885
Richmond, Henry A. Cor. Delaware and Tupper Sts., Buffalo, N. Y.	July 7, 1870
Rumsey, B. C. Buffalo, N. Y	May 12, 1870
Stanton, John Robert. 11 William St., New York City	April 4, 1899
Walker, George Clarke. 228 Michigan Ave., Chicago, Ill	Feb. 6, 1873
Watson, James. Paterson, N. J	Dec. 5, 1872
Welton, Nelson James. Waterbury, Conn	Jan. 20, 1873

Fellows (not Members), 27.

SUMMARY OF MEMBERSHIP, FEBRUARY 10th, 1905.

Honorary Members	10
Corresponding Members	2
Members	1 819
Associate Members	918
Associates	123
Juniors	350
Fellows (not Members)	27
Total	3 249

GEOGRAPHICAL LIST.

NORTH AMERICA.

CANADA. Total Membership, 74.

Members.—***Almonte, Ont.***—A. Bell. ***Amherstburg, Ont.***—C. Y. Dixon. ***Berlin, Ont.***—W. H. Breithaupt. ***Glace Bay, N. S.***—G. H. Duggan. ***Grand Forks, B. C.***—J. H. Kennedy. ***Hamilton, Ont.***—E. Fisher. ***Moncton, N. B.***—P. S. Archibald, W. B. Mackenzie. ***Montreal, Que.***—F. S. Darling, H. Goldmark, J. L. Harrington, J. Hobson, H. Holgate, H. S. Holt, P. Johnson, J. Kennedy, P. A. Peterson, A. W. Robinson, J. Ross, J. M. Shanly, F. P. Shearwood, W. F. Tye. ***New Westminster, B. C.***—G. A. Keefer. ***Niagara Falls, Ont.***—C. H. Mitchell, A. A. Stuart, O. B. Suhr, B. R. Value. ***Ottawa, Ont.***—M. J. Butler, W. Crawford, S. Fleming, T. C. Keefer, F. Moberly, J. L. P. O'Hanly. ***Peterborough, Ont.***—W. J. Francis. ***Port Arthur, Ont.***—J. H. Bacon. ***Toronto, Ont.***—W. Chipman, C. E. Goad, W. T. Jennings, E. H. Keating, A. B. Ross, C. H. Rust. ***Vernow, B. C.***—F. R. Johnson, ***Victoria, B. C.***—H. P. Bell, F. C. Gamble, A. S. Going, E. Mohun. ***Walkerville, Ont.***—W. Pope. ***Winnipeg, Man.***—H. N. Ruttan, J. G. Sullivan.

Associate Members.—***Amherstburg, Ont.***—H. Hodgman. ***Fredericton, N. B.***—E. E. Brydone-Jack. ***Goderich, Ont.***—J. G. MacGregor. ***Hamilton, Ont.***—R. M. Roy. ***Lachine Locks, Que.***—E. A. Rhys-Roberts. ***Lourdes, N. S.***—W. H. Hyde. ***Montreal, Que.***—C. E. Gudewill, G. P. Hawley, R. E. Hunter. ***Niagara Falls, Ont.***—G. Baum, J. Thornley. ***Ottawa, Ont.***—S. J. Chapleau. ***Saint John, N. B.***—J. K. Scammell. ***Sault Ste. Marie, Ont.***—L. H. Davis. ***Shawinigan Falls, Que.***—C. H. Moritz. ***Toronto, Ont.***—E. R. Simpson. ***Vancouver, B. C.***—C. W. McMeekin. ***Winnipeg, Man.***—A. G. Allan.

Associates.—***Montreal, Que.***—T. J. Drummond, E. McG. Quirk.

Juniors.—***Calgary.***—C. B. Brown, Jr. ***Montreal, Que.***—W. C. Brown. ***Niagara Falls, Ont.***—K. M. Cameron. ***Winnipeg, Man.***—M. P. Cotton, H. S. Hancock, Jr.

MEXICO. Total Membership, 43.

Honorary Members.—***Mexico.***—R. B. Gorsuch.

Members.—***Bonanza.***—R. C. Gemmell. ***Chihuahua.***—H. W. Edwards, ***Colima.***—A. P. Herbert. ***Culiacan.***—F. E. Butterfield. ***Escalon.***—V. P. Safford. ***Fuerte.***—E. A. H. Tays. ***Hermosillo.***—A. F. Wrotnowski.

Mexico.—R. Adam, J. B. Body, R. E. Briggs, T. A. Corry, J. E. Earley, S. J. Fortin, R. Gayol, L. Kingman, J. E. McCurdy, J. L. Phillips, E. K. Smoot. ***Monterey.***—R. Meyer, N. Turner. ***Orizaba.***—S. W. Stacpoole. ***Rincon Antonio.***—D. Coe. ***Santa Fe.***—I. Mathewson.

Associate Members.—***Cananea.***—J. P. Hallihan. ***Durango.***—F. W. Andros, C. J. Carroll, R. Johnson. ***Mapimi.***—C. F. Parker. ***Mexico.***—W. G. Moler. ***Monterey.***—F. H. Dillon. ***Orizaba.***—W. A. Hill. ***Rincon Antonio.***—J. W. Miles. ***Tantima.***—W. K. Runyon. ***Tonala.***—J. H. Bowman.

Associates.—***Mexico.***—W. W. Graham.

Juniors.—***Chihuahua.***—R. S. Webster. ***Coatzacoalcos.***—S. A. Miller. ***Durango.***—L. F. Whitbeck. ***Guadalajara.***—M. de la Mora. ***Mexico.***—C. Castellanos, E. Ortiz. ***Saltillo.***—V. Saucedo.

UNITED STATES.

ALABAMA. Total Membership, 22.

Members.—***Birmingham.***—W. B. Allen, J. R. Carter, G. H. Clark, J. A. Emery, S. Hazard, J. W. Kendrick, J. A. Montgomery. ***Demopolis.***—H. S. Bosler. ***Mobile.***—J. N. Hazlehurst. ***Montgomery.***—D. M. Andrews.

Associate Members.—***Anniston.***—E. Zarbell. ***Birmingham.***—H. F. Wilson, Jr. ***Ensley.***—G. R. Ramsey. ***Florence.***—W. S. Winn. ***Holt.***—C. M. Ayres. ***Mobile.***—D. G. Anderson. ***Tecumseh.***—B. Cole. ***Tuscaloosa.***—G. K. Little, S. Van Pelt.

Juniors.—***Birmingham.***—F. R. Berry. ***Mobile.***—F. F. Pillet. ***Montgomery.***—W. G. Arn.

ALASKA. Total Membership, 1.

Members.—***Seward.***—W. B. Poland.

ARIZONA. Total Membership, 9.

Members.—***Globe.***—L. D. Ricketts. ***Livingstone.***—F. Teichman. ***Prescott.***—W. A. Drake. ***Tucson***—D. H. Whitmer. ***Yuma.***—H. Hamlin.

Associate Members.—***Roosevelt.***—C. W. Smith. ***Tucson.***—J. C. McClure. ***Yuma.***—R. G. Doerfling.

Juniors.—***Tucson.***—G. E. P. Smith.

ARKANSAS. Total Membership, 10.

Members.—***Arkansas City.***—W. D. Jenkins. ***Fort Smith.***—F. A. Molitor. ***Little Rock.***—G. D. Fitch, F. O. Melcher. ***Mansfield.***—G. E. Otis.

Associate Members.—***Fayetteville.***—J. J. Knoch. ***Fort Smith.***—C. W. L. Armour. ***Little Rock.***—R. L. Lund.

Juniors.—***Little Rock.***—C. N. Kast. ***Mound.***—R. L. Alexander.

CALIFORNIA. Total Membership, 112.

Honorary Members.—***San Francisco.***—G. Davidson, G. E. Gray.

Members.—***Alameda.***—D. C. Henny. ***Berkeley.***—W. C. Ambrose, P. E. Harroun, H. Kower. ***Fresno.***—I. Teilman. ***Grass Valley.***—A. DeW. Foote. ***La Jolla.***—E. Holbrook. ***Los Angeles.***—B. Bassell, R. B. Burns, D. W. Cunningham, F. Eaton, H. E. Green, W. D. Larrabee, J. B. Lippincott, C. H. McKinstry, E. Newman, F. H. Olmsted, W. H. Sanders, J. D. Schuyler, S. Storrow, F. E. Trask, E. H. Warner, E. T. Wheeler, E. T. Wright. ***Monrovia.***—F. D. Howell, Jr. ***Oakland.***—E. M. Boggs, A. B. Fitch, L. J. Le Conte. ***Oroville.***—L. J. Hohl. ***Pasadena.***—H. Breen. ***Pomona.***—A. W. Wright. ***Redlands.***—W. A. Nichols. ***Sacramento.***—R. B. Marshall. ***San Diego.***—H. T. Richards. ***San Francisco.***—A. L. Adams, F. J. Amweg, B. Bienenfeld, A. J. Bowie, J. H. Covode, G. L. Dillman, E. Duryea, Jr., W. R. Eckart, W. C. Edes, J. L. Frazier, H. D. Gates, W. H. Hall, T. H. Handbury, W. W. Harts, W. H. Heuer, S. G. Hindes, H. C. Holmes, W. Hood, J. M. Howells, J. D. Isaacs, N. B. Kellogg, W. H. Leffingwell, M. Manson, D. E. Melliss, E. J. Molera, M. M. O'Shaughnessy, C. W. Raymond, F. J. H. Rickon, F. Riffle, E. A. Rix, C. H. Snyder, C. Uhlig, O. von Geldern, J. H. Wallace. ***Santa Clara.***—C. E. Moore. ***Stanford University.***—C. D. Marx. ***Tustin.***—C. W. Curry. ***Ventura.***—G. C. Power.

Associate Members.—***Berkeley.***—C. Derleth, Jr., L. E. Hunt, S. E. Kieffer, E. N. Prouty. ***Exeter.***—J. H. Crosett. ***Iron Mountain.***—T. J. Jones. ***Los Angeles.***—A. C. Hardison, W. S. Post, J. G. Tait. ***Mare Island.***—H. H. Rousseau. ***Martinez.***—W. C. Hammatt. ***Oakland.***—G. D. Stratton. ***Palo Alto.***—J. C. L. Fish, C. B. Wing. ***Pasadena.***—F. E. Wilcox. ***San Francisco.***—S. Baker, H. De H. Connick, H. T. Cory, R. M. Drake, W. H. Ferguson, E. F. Haas, J. Jacobs, N. B. Livermore, H. C. Phillips. ***San Jose.***—W. T. Turner. ***San Pedro.***—A. B. Diehr.

Juniors.—***Berkeley.***—W. H. Phillips. ***Cornwall.***—O. P. Shelley. ***Coyote.***—H. L. Haehl. ***Los Angeles.***—E. L. Veuve. ***National City.***—S. N. Caceres. ***Oakland.***—A. Kempkey, Jr. ***San Francisco.***—J. O. Burrage, E. M. Chadbourne, C. T. Dudley, C. E. Gilman, E. Talbot. ***San Jose.***—K. F. Cooper.

COLORADO. Total Membership, 32.

Members.—***Denver.***—T. W. Jaycox, A. E. Kastl, J. MacFarlane, G. T. Prince, M. H. Rogers, H. N. Savage, H. A. Sumner, W. C. Wetherill. ***Edgewater.***—F. A. Calkins. ***La Junta.***—F. M. Bisbee. ***Pueblo.***—H. R. Holbrook. ***Salida.***—J. W. Deen. ***Telluride.***—J. Herron.

Associate Members.—***Boulder.***—M. S. Ketchum. R. S. Sumner. ***Denver.***—P. M. Churchill, C. W. Comstock, L. Duncan, T. E. Knowlton, E. A. Lee, O. O. McReynolds, J. W. Martin, C. W. Raynor, W. E. Swift. ***Fort Collins.***—G. N. Houston. ***Montrose.***—I. W. McConnell, J. A. Sargent.

Associates.—***Denver.***—L. C. Phipps.

Juniors.—***Denver.***—W. S. Getchell, V. A. Kauffman, F. C. Magruder. ***Montrose.***—J. H. Miner.

CONNECTICUT. Total Membership, 57.

Members.—***Berlin.***—D. E. Bradley, C. F. Chase. ***Danbury.***—J. W. Bacon. ***Derby.***—D. S. Brinsmade. ***Hartford.***—H. W. Ayres, G. M. Bond, E. D. Graves, T. H. McKenzie, E. C. Terry. ***Middletown.***—G. H. Bishop. ***New Britain.***—C. M. Jarvis. ***New Haven.***—C. Blakeslee, A. J. Du Bois, C. A. Ferry, H. H. Gladding, A. B. Hill, C. M. Ingersoll, Jr., C. W. Kelly, E. H. McHenry, W. F. Merrill, W. H. Moore, G. E. Verrill. ***New London.***—P. C. Asserson, C. C. Elwell, C. F. Powell. ***Norwalk.***—R. Van Buren. ***Stamford.***—B. D. Greene. ***Waterbury.***—W. W. Bonnett, R. A. Cairns.

Associate Members.—***Bridgeport.***—A. P. Law, S. P. Senior. ***Derby.***—D. E. Brinsmade. ***Hartford.***—E. W. Bush, R. N. Clark, F. L. Ford, J. T. Henderson. ***Meriden.***—H. J. Wild. ***New Haven.***—C. R. Harte, C. H. Nichols, L. D. Rights, W. T. Spencer, E. W. Wiggin. ***New London.***—E. R. Gayler. ***South Manchester.***—J. L. Adams. ***Stamford.***—L. B. Jenckes. ***Stratford.***—S. P. Brown. ***West Hartford.***—W. E. Johnson.

Associates.—***Middletown.***—E. T. Belden.

Juniors.—***Bridgeport.***—J. Y. Higginson. ***Hartford.***—H. R. Buck. ***New Haven.***—E. W. Crawley, E. E. Minor, E. M. T. Ryder, C. L. Slocum. ***Pomfret.***—R. H. Sabin. ***West Haven.***—W. J. Backes.

Fellows.—***Waterbury.***—N. J. Welton.

DELAWARE. Total Membership, 11.

Members.—***Newark.***—J. R. Maxwell. ***New Castle.***—A. Bryson. ***Wilmington.***—H. F. Baldwin, T. C. Hatton, T. A. Leisen, G. Tatnall.

Associate Members.—***Wilmington.***—W. S. Morrison, G. Rommel, Jr.

Associates.—***Wilmington.***—A. J. Moxham.

Juniors.—***Wilmington.***—A. J. Taylor.

Fellows.—***Wilmington.***—B. du Pont.

DISTRICT OF COLUMBIA. Total Membership, 86.

Members.—***Washington.***—F. V. Abbot, T. H. Aldrich, F. L. Averill, C. C. Babb, E. C. Barnard, K. Berle, J. Biddle, E. Burr, D. S. Carll, F. T. Chambers, W. Crozier, A. P. Davis, E. M. Douglas, C. G. Elliott, M. T. Endicott, C. H. Fitch, O. B. French, F. Freyhold, B. R. Green, C. E. Grunsky, W. C. Gunnell, P. C. Hains, J. H. Hanna, E. D. Hardy, B. M. Harrod, H. F. Hodges, D. J. Howell, C. B. Hunt, W. V. Judson, C. W. Kutz, D. W. Lum, A. Mackenzie, J. D. Maclennan, D. E. McComb, F. B. Maltby, E. Mead, J. J. Morrow, F. H. Newell, G. L. Nicolson, A. G. Norton, R. E. Peary, E. T. Perkins, A. E. Phillips, F. C. Prindle, J. H. Quinton, R. C. Smead, G. B. Strickler, T. W. Symons, O. H. Tittmann, F. C. Warman, A. H. Weber, E. G. Williams, H. M. Wilson.

Associate Members.—*Washington.*—H. Davis, H. S. Farquhar, N. C. Grover, J. F. Hayford, E. A. Hill, J. C. Hoyt, A. B. Ilsley, W. C. Lyon, C. A. McKenney, F. E. Matthes, H. Munroe, E. C. Murphy, C. R. Olberg, G. B. Pillsbury, H. A. Pressey, De W. L. Reaburn, E. Schmitt, H. Stidham, G. E. Stratton, W. McG. Wallace.

Associates.—*Washington.*—E. C. Eckel, F. L. Freeman, J. F. Golding, G. Pinchot.

Juniors.—*Washington.*—R. E. Adams, E. W. Banker, R. D. Black, J. B. Gordon, E. C. Heald, F. C. Hilder, A. H. Horton, W. P. Tunstall, F. R. Weller.

FLORIDA. Total Membership, 12.

Members.—*Bartow.*—M. A. Waldo. *Jacksonville.*—J. W. Sackett. *Mandarin.*—A. F. Harley. *Mayport.*—F. W. Bruce. *Miami.*—E. B. Thomson. *Pensacola.*—H. R. Stanford. *St. Augustine.*—L. R. McLain.

Associate Members.—*Jacksonville.*—F. C. Phillips. *Key West.*—J. M. Braxton. *Miami.*—R. W. Carter.

Juniors.—*Miami.*—A. J. Sackett. *Pensacola.*—R. D. M. Henley.

GEORGIA. Total Membership, 24.

Members.—*Americus.*—G. M. Eldridge. *Atlanta.*—R. M. Clayton, D. B. Dunn, A. Pew, A. F. Woolley. *Augusta.*—N. Wingfield. *Blue Ridge.*—G. K. McCormick. *Columbus.*—B. H. Hardaway. *Marietta.*—C. B. Wilson. *Savannah.*—G. M. Gadsden, J. De B. Kops, A. C. Olney, H. M. Steele.

Associate Members.—*Americus.*—C. W. Murray. *Athens.*—C. M. Strahan. *Atlanta.*—T. P. Branch, M. H. Wright. *Dodge.*—G. W. Armitage. *Elberton.*—H. S. Jaudon. *Fort McPherson.*—L. H. Mattair.

Associates.—*Atlanta.*—G. H. Crafts.

Juniors.—*Atlanta.*—C. L. Richardson. *Rome.*—L. R. Whitted. *Savannah.*—W. D. Faucette.

HAWAII. Total Membership, 4.

Members.—*Honolulu.*—C. H. Kluegel, J. T. Taylor.

Associate Members.—*Hilo.*—R. Hawxhurst, Jr.

Juniors.—*Paia.*—J. H. Foss.

IDAHO. Total Membership, 7.

Members.—*Boise* —D. W. Ross, A. J. Wiley. *Lewiston.*—W. H. Hill. *Minidoka.*—F. C. Horn.

Associate Members.—*Centerville.*—T. G. Janney.

Juniors.—*Boise.*—W. G. Davies. *Pocatello.*—H. A. Roberts.

ILLINOIS. Total Membership, 160.

Members.—*Champaign.*—I. O. Baker. *Chicago.*—J. W. Alvord, S. G. Artingstall, C. B. Ball, W. D. Barber, O. Bates, E. J. Beard, E. H. Beckler, C. E. Billin, W. L. Breckinridge, G. H. Bremner, E. Du B. Brown, J. Brun-

ner, H. M. Byllesby, W. M. Camp, E. C. Carter, C. H. Cartlidge, O. Chanute, G. B. Christie, J. A. Cole, T. L. Condron, L. E. Cooley, W. L. Cowles, A. S. Crane, H. S. Crocker, W. W. Curtis, W. L. Darling, C. R. Dart, F. A. Delano, J. Dun, De C. Dunlap, A. R. Eldridge, G. E. Ellis, H. N. Elmer, J. E. Ericson, O. H. Ernst, J. M. Ewen, S. M. Felton, R. Forsyth, L. C. Fritch, J. L. Fyfe, W. J. Harahan, C. A. Hasbrouck, J. N. Hatch, G. T. Horton, H. E. Horton, C. W. Hotchkiss, W. M. Hughes, R. W. Hunt, H. H. Jackman, J. W. Kendrick, G. H. Kimball, G. A. Lederle, E. H. Lee, F. J. Llewellyn, J. Lowe, C. F. Loweth, W. A. Lydon, D. MacAllister, W. S. MacHarg, C. MacRitchie, A. J. Mason, D. W. Mead, R. Modjeski, E. S. Nethercut, J. Nichol, L. A. Nichols, H. W. Parkhurst, A. V. Powell, I. Randolph, A. F. Reichmann, A. F. Robinson, W. A. Rogers, W. H. Rosencrans, S. McM. Rowe, A. T. Sabin, J. W. Schaub, E. K. Scott, J. A. Seddon, E. C. Shankland, R. M. Shankland, D. Sloan, W. S. Smith, V. K. Spicer, J. F. Stevens, A. C. Stites, C. L. Strobel, F. H. Todd, H. U. Wallace, C. V. Weston, H. F. White, D. J. Whittemore, P. Willis, E. B. Wilson, G. M. Wisner, A. Ziesing. ***East St. Louis.***—H. F. Juengst. ***Evanston.***—C. J. Morse. ***Geneseo.***—M. G. Barnes. ***Joliet.***—F. C. H. Arentz. ***La Grange.***—W. B. Ewing. ***Litchfield.***—A. G. Kleinbeck. ***Peoria.***—D. H. Maury, J. W. Woermann. ***Pullman.***—A. Twyman. ***Quincy.***—E. Prince. ***Rock Island.***—J. L. Lusk, A. L. Richards. ***Sterling.***—F. W. Honens, L. L. Wheeler. ***Thebes.***—W. E. Angier. ***Urbana.***—A. N. Talbot. ***Winnetka.***—W. H. Finley.

Associate Members.—***Centralia.***—J. C. Sesser. ***Chicago.***—F. R. Coates, R. L. Gifford, A. Gravelle, W. F. Graves, A. H. Green, E. McK. Hagar, J. C. Hain, F. L. Hartigan, J. P. Johnston, C. L. Keller, P. R. MacNeille, E. D. Sabine, E. L. Shaw, M. E. Shire, E. M. Smith, J. G. Spielman, W. E. S. Strong, E. E. R. Tratman, E. Walther, O. J. West. ***Dixon.***—T. J. Klossowski. ***East St. Louis.***—C. J. Eld, Jr., E. G. Helm. ***Galesburg.***—J. E. Murphy. ***Madison.***—R. E. Griswold. ***Peoria.***—J. H. Best, J. A. Harman. ***Shabbona Grove.***—J. E. Shepardson. ***Shelbyville.***—C. E. Chester. ***Urbana.***—F. G. Frink. ***Wyanet.***—J. Wright.

Associates.—***Chicago.***—C. M. Foster, C. F. Quincy, J. H. Warder.

Juniors.—***Abingdon.***—J. W. Sussex. ***Chicago.***—B. Borland, M. H. Brinkley, M. S. Darrow, J. W. Ludlow, W. Raster, R. A. Widdicombe. ***East St. Louis.***—W. A. Thompson. ***Peoria.***—C. Millard.

Fellows.—***Chicago.***—E. W. Blatchford, N. S. Bouton, G. C. Walker.

INDIAN TERRITORY. Total Membership, 4.

Members.—***Sulphur.***—H. V. Hinckley.

Associate Members.—***Ramona.***—D. Hays. ***Stigler.***—H. A. Paine.

Juniors.—***Muskogee.***—S. A. Cobb.

INDIANA. Total Membership, 19.

Members.—***Guilford.***—H. F. Northrup. ***Indianapolis.***—G. H. Binkley, C. C. Brown, M. M. Defrees, J. A. McKim, M. W. Mansfield, R. P. Woods.

Lafayette.—W. D. Pence. ***South Bend.***—A. J. Hammond, O. E. Strehlow. ***Terre Haute.***— M. A. Howe.

Associate Members.—***Anderson.***—W. S. Moore. ***Bluffton.***—O. S. Osborn. ***Indianapolis.***—A. R. Holliday, C. S. Millard, C. A. Paquette. ***Lafayette.***—W. K. Hatt. ***Terre Haute.***—F. W. Adgate.

Juniors.—***Wabash.***—C. E. Howe.

IOWA. **Total Membership, 11.**

Members.—***Ames.***—A. Marston. ***Burlington.***—F. D. H. Lawlor, E. A. Steece. ***Davenport.***—G. H. Boynton, C. Francis. ***Iowa City.***—W. G. Raymond. ***Keokuk.***—M. Meiggs. ***Sioux City.***—H. M. Chittenden.

Associate Members.—***Ames.***—L. E. Ashbaugh, F. C. French. ***Davenport.***—W. H. Kimball.

KANSAS. **Total Membership, 16.**

Members.—***Baxter Springs.***—M. S. Parker. ***Lawrence.***—W. McGrath, F. O. Marvin. ***Leavenworth.***—E. H. Connor, W. H. Jones, G. W. Vaughn. ***Topeka.***—E. W. Grant, C. A. Morse, W. B. Storey, Jr.

Associate Members.—***Fort Leavenworth.***—W. D. Connor, W. Kelly. ***Lawrence.***—J. de N. McComb, Jr., T. B. Sears. ***Leavenworth.***—C. M. Pritchard. ***Pittsburg.***—A. Schneider. ***Topeka.***—L. B. Smith.

KENTUCKY. **Total Membership, 27.**

Members.—***Covington.***—G. B. Nicholson. ***Danville.***—C. Breckinridge. ***Earlington.***—J. B. Atkinson. ***Lexington*** —W. D. Pickett. ***Louisville.***—E. H. Bowser, W. H. Courtenay, F. de Funiak, J. A. Fairleigh, C. Hermany, W. E. Hutchings, J. M. Johnson, E. E. Kuersteiner, R. Montfort, M. Morris, G. W. Shaw, J. E. Willard. ***St. Matthews.***—R. Fink.

Associate Members.—***Lebanon.***—J. F. Burns. ***Lexington.***—J. P. Brooks, W. A. D. Short. ***Newport.***—W. L. Glazier. ***Somerset.***—C. C. FitzGerald.

Associates.—***Louisville.***—J. B. Speed.

Juniors.—***College Hill.***—H. de B. Forbes. ***Louisville.***—J. B. Hutchings, Jr.

Fellows.—***Louisville.***—W. R. Belknap, T. C. Coleman.

LOUISIANA. **Total Membership, 28.**

Members.—***Boyce.***—C. H. Chamberlin. ***Monroe.***—H. M. Marshall. ***New Orleans.***—A. C. Bell, L. F. Bellinger, L. W. Brown, J. F. Coleman, E. B. Cushing, C. Donovan, G. G. Earl, J. T. Eastwood, W. J. Hardee, F. M. Kerr, S. F. Lewis, J. T. Norton, A. Perrilliat, A. L. Phillips, R. Quinn, H. B. Richardson, L. W. Stubbs, W. B. Wright.

Associate Members.—***Monroe.***—L. E. Lion. ***New Orleans.***—J. R. Downman, C. W. J. Neville, M. P. Robertson. ***Shreveport.***—A. Mayer.

Juniors.—***New Orleans.***—W. J. Plogsted, A. C. Polk, J. F. Richardson.

MAINE. Total Membership, 22.

Members.—***Boothbay Harbor.***—T. W. Baldwin. ***Gardiner.***—F. Danforth. ***Houlton.***—M. Burpee. ***Millinocket.***—H. S. Ferguson. ***Orono.***—G. H. Hamlin. ***Portland.***—W. M. Black, C. C. A. Both, F. S. Burrowes, B. W. Guppy, E. C. Jordan. ***Rumford Falls.***—C. A. Mixer. ***Wiscasset.***—G. P. Farley.

Associate Members.—***Bangor.***—F. L. Marston. ***Houlton.***—R. D. Coombs, Jr. ***Millinocket.***—F. C. Bowler, J. W. Tower. ***Orono.***—H. S. Boardman. ***Portland.***—C. R. Hall, H. H. Robinson. ***Rockland.***—O. H. Tripp.

Juniors.—***Cape Cottage.***—A. L. True. ***Millinocket.***—H. P. Hoyt.

MARYLAND. Total Membership, 43.

Members.—***Annapolis.***—A. C. Cunningham. ***Baltimore.***—H. D. Bush, D. D. Carothers, M. Cohen, B. T. Fendall, J. E. Greiner, F. H. Hambleton, J. H. Harlow, C. A. Hook, R. L. Hoxie, N. H. Hutton, W. L. Kenly, W. T. Manning, C. S. Sims, F. L. Stuart, C. O. Vandevanter. ***Catonsville.***—G. B. Hazlehurst. ***Cumberland.***—J. Q. Barlow, H. R. Talcott. ***Ruxton.***—J. Fisher. ***Sparrows Point.***—L. M. Cox.

Associate Members.—***Baltimore.***—E. D. Cummings, W. R. Edwards, D. W. Gross, I. O. Harper, W. N. Hazen, V. K. Hendricks, J. T. N. Hoyt, A. N. Johnson, O. F. Lackey, A. M. Quick, J. L. Wickes, A. J. Wills. ***Conowingo.***—J. H. Harlow, Jr., G. F. Rowell. ***Cumberland.***—H. A. Lane, H. Rittenhouse. ***Fort Washington.***—H. A. Young. ***Silver Springs.***—W. E. Herring.

Juniors.—***Annapolis.***—C. H. Stratton. ***Baltimore.***—J. M. Hood, Jr. ***Chestertown.***—M. deK. Smith, Jr. ***Havre de Grace.***—F. S. Senior.

MASSACHUSETTS. Total Membership, 186.

Members.—***Auburndale.***—W. P. Snow. ***Boston.***—C. F. Allen, T. Aspinwall, F. A. Barbour, E. J. Beugler, H. Bissell, D. Brackett, W. H. Bradley, F. Brooks, W. M. Brown, A. E. Burton, H. A. Carson, H. H. Carter, A. S. Cheever, J. E. Cheney, S. Child, E. C. Clarke, F. C. Coffin, W. W. Cummings, F. S. Curtis, R. B. Davis, E. P. Dawley, E. S. Dorr, G. C. Emerson, G. E. Evans, F. H. Fay, B. R. Felton, J. P. Frizell, F. L. Fuller, X. H. Goodnough, H. A. Hall, E. Harrington, H. W. Hayes, F. W. Hodgdon, G. Hodges, J. L. Howard, E. W. Howe, W. Jackson, F. C. Kimball, G. A. Kimball, H. V. Macksey, W. E. McClintock, H. Manley, L. Metcalf, E. F. Miller, H. A. Miller, G. S. Morrill, C. Morton, J. E. Palmer, W. Parker, A. L. Plimpton, D. Porter, L. F. Rice, I. Rich, J. W. Rollins, Jr., W. Rotch, C. M. Saville, C. W. Sherman, G. E. Sleeper, F. A. Snow, F. H. Snow, J. P. Snow, O. Sonne, F. P. Stearns, G. F. Swain, L. A. Taylor, S. E. Tinkham, G. M. Tompson, E. K. Turner, L. C. Wason, W. Watson, W. Wheeler, F. O. Whitney, H. B. Wood, C. J. H. Woodbury, J. R. Worcester. ***Brookline.***—S. C. Ellis, D. FitzGerald, A. H. French. ***Cambridge.***—L. J. Johnson, E. D. Leavitt, J. C. Moses. ***Clinton.***—H.

Parker, T. F. Richardson, C. E. Wells. ***East Boston.***—R. A. Shailer. ***Holyoke.***—T. Appleton, E. P. Butts, E. A. Ellsworth, J. L. Tighe, N. H. Whitten. ***Hyde Park.***—E. A. W. Hammatt. ***Jamaica Plain.***—S. C. Heald. ***Lawrence.***—R. A. Hale, I. L. Sjöström. ***Lowell.***—G. Bowers, A. T. Safford. ***Lynn.***—C. W. Gay. ***Malden.***—J. H. Clark, R. L. Read, G. A. Wetherbee. ***New Bedford.***—A. B. Drake. ***Newton.***—E. Sawyer. ***Newton Center.***—D. H. Andrews. ***North Adams.***—J. H. Emigh, F. B. Locke. ***Somerville.***—W. F. Goodrich. ***Springfield.***—G. N. Merrill, C. M. Slocum, E. E. Stone. ***Taunton.***—L. Dean. ***Tufts College.***—F. B. Sanborn. ***Turners Falls.***—C. W. Hazelton. ***Walpole.***—W. L. Bowker. ***Watertown.***—W. T. Pierce. ***West Newton.***—H. D. Woods. ***Worcester.***—C. A. Allen, R. H. Brown, W. E. Buck, A. W. French, D. M. Wheeler, G. H. White.

Associate Members.—***Amherst.***—J. E. Ostrander. ***Auburndale.***—E. E. Young. ***Beverly.***—C. H. Farnham. ***Boston.***—W. M. Bailey, W. H. Balch, W. T. Barnes, H. K. Barrows, G. C. Bartram, C. B. Breed, M. F. Brown, W. L. Butcher, J. W. Buzzell, J. N. Ferguson, J. K. Freitag, A. D. Fuller, L. E. Hawes, C. S. Humphreys, W. S. Johnson, F. W. Kinsey, H. J. MacNair, H. S. R. McCurdy, F. P. McKibben, E. E. Pettee, J. W. Pierce, C. M. Spofford, E. B. Stearns, C. F. Taylor, H. F. Tucker, R. S. Weston, F. E. Winsor. ***Clinton.***—M. J. Look, H. J. Morrison. ***Concord.***—W. D. Hubbard. ***East Milton.***—C. G. Waitt. ***Fall River.***—B. T. Buffinton, W. E. Noble. ***Gleasondale.***—W. C. Lambert. ***Holyoke.***—A. F. Sickman. ***Housatonic.***—J. M. Race. ***Lawrence.***—A. H. Greenwood, C. H. Umstead. ***Newburyport.***—G. H. Bliss. ***Newton Highlands.***—S. E. Thompson. ***Northboro.***—G. W. Booth. ***Oakdale.***—E. H. Baldwin. ***Quincy.***—P. Lawton. ***South Framingham.***—W. W. Locke. ***West Roxbury.***—C. R. Gow. ***Worcester.***—C. M. Allen, V. P. Curtis, H. P. Eddy.

Associates.—***Boston.***—J. J. Monahan, H. A. Phillips. ***Springfield.***—H. L. Norton. ***Waltham.***—W. Roberts.

Juniors.—***Boston.***—J. V. D. Beekman, Jr., W. E. Belcher, E. W. Bowditch. ***Charlestown.***—E. C. Hayden. ***Framingham.***—R. E. Barrett. ***Malden.***—W. E. Barnes. ***Nantucket.***—H. M. Harps.

Fellows.—***Montague City.***—B. N. Farren. ***Swampscott.***—S. Holman.

MICHIGAN. **Total Membership, 55.**

Members.—***Ann Arbor.***—J. B. Davis, G. S. Williams. ***Atlantic Mine.***—F. McM. Stanton. ***Benton Harbor.***—J. W. Pearl. ***Detroit.***—F. H. Alfred, A. B. Atwater, F. T. Barcroft, W. H. Bixby, C. E. L. B. Davis, B. Douglas, W. L. Fisk, J. A. Fulton, R. B. Green, E. E. Haskell, J. D. Hawks, D. F. Henry, H. S. Hodge, C. W. Hubbell, J. C. Hutchings, R. H. McCormick, F. C. Shenehon, J. Tuthill, H. A. E. C. von Schon, G. H. Webb, E. S. Wheeler, G. Y. Wisner. ***Grand Rapids.***—F. W. Lehnartz, D. McCool, J. J. McVean, K. S. Riser. ***Grosse Ile.***—F. B. Howard. ***Houghton.***—G. A. Marr. ***Jackson.***—R. M. Newman. ***Kalamazoo.***—G. S. Pierson. ***Lapier.***—F. Morley. ***Manistee.***—E. W. Muen-

scher. ***Marquette.***—R. C. Young. ***Sault Ste. Marie.***—J. Ripley, L. C. Sabin.

Associate Members.—***Ann Arbor.***—A. E. Greene, C. J. Tilden. ***Coldwater.***—C. G. Moore. ***Detroit.***—M. Blanchard, J. E. Ferguson, J. Kahn. ***Grand Rapids.***—G. M. Ames, L. W. Goddard.—***Houghton.***—J. F. Jackson. ***Manistee.***—M. Toltz.

Associates.—***Grand Rapids.***—F. L. Gaines. ***Saginaw.***—G. L. Burrows.

Juniors.—***Detroit.***—B. Rohnert. ***Grand Rapids.***—G. J. Davis, Jr., R. H. Merrill. ***Traverse City.***—J. F. Wilhelm.

MINNESOTA. **Total Membership, 45.**

Members.—***Duluth.***—C. Coleman, J. H. Darling, F. E. House, T. Pettigrew, C. L. Potter, D. A. Reed, H. H. Wadsworth. ***Freeburgh.***—J. Till. ***Minneapolis.***——F. W. Cappelen, W. de la Barre, J. T. Fanning, L. S. Gillette, H. G. Kelley, W. D. Lovell, C. H. Prior, H. E. Stevens, G. W. Sublette, C. A. P. Turner, G. L. Wilson. ***St. Paul.***—C. Le R. Annan, R. B. C. Bement, O. Claussen, J. R. W. Davis, G. McC. Derby, G. H. Hutchinson, E. W. Lewis, C. J. A. Morris, A. W. Münster, A. O. Powell, M. E. Reed, L. W. Rundlett, D. C. Shepard, W. C. Smith. ***Winona.***—W. Beahan.

Associate Members.—***Duluth.***—F. A. Cokefair, T. F. McGilvray. ***Minneapolis.***—F. H. Constant, F. M. Henry, J. W. Rickey. ***St. Paul.***—G. A. Kyle, E. C. Macy, P. E. Stevens, M. J. Thompson.

Associates.—***St. Paul.***—H. Elliott.

Fellows.—***St. Paul.***—J. J. Hill.

MISSISSIPPI. **Total Membership, 12.**

Members.—***Greenville.***—A. Hider, R. Somerville, E. C. Tollinger, C. H. West. ***Jackson.***—W. G. Kirkpatrick. ***Natchez.***—E. B. Geddes. ***Scranton.***—C. W. Sturtevant.

Associate Members.—***Gautier.***—J. B. Lindsey, Jr. ***Greenville.***—S. Archer, Jr. ***Vicksburg.***—A. M. Todd, A. A. Woods, Jr.

Juniors.—***Laurel.***—H. M. George.

MISSOURI. **Total Membership, 101.**

Members.—***Columbia.***—A. L. Hyde, F. P. Spalding. ***Kansas City.***—G. J. Bell, A. M. Blodgett, D. Bontecou, C. S. Burns, L. A. Dunham, H. H. Filley, S. W. Fox, I. G. Hedrick, J. W. Hoover, W. Kiersted, R. J. McCarty, A. Maitland, Jr., M. P. Paret, G. W. Pearsons, A. A. Trocon, J. A. L. Waddell, R. W. Waddell. W. P. Watson. ***Kirkwood.***—H. W. Baker. ***Riverside.***—C. F. Stephens. ***Rolla.***—E. G. Harris. ***St. Joseph.***—J. F. Barnard. ***St. Louis.***—C. Blackwell, B. L. Brown, M. L. Byers, O. W. Childs, B. H. Colby, A. O. Cunningham, S. B. Fisher, E. Flad, C. Gayler, L. F. Goodale, J. V. Hanna, F. T. Hatch, E. A. Hermann, J. F. Hinckley, M. L. Holman, J. R. Hudson, A. L. Johnson, F. G.

Jonah, C. H. Ledlie, B. McKeen, R. E. McMath, C. V. Mersereau, O. E. Mogensen, R. Moore, J. A. Ockerson, H. Phillips, R. H. Phillips, C. de la C. Purdon, J. Ramsey, Jr., H. L. Reber, H. Rohwer, S. B. Russell, H. P. Taussig, J. L. Van Ornum, R. L. Van Sant.

Associate Members.—***Barnett.***—C. C. Crew.—***Columbia.***—W. S. Williams. ***Grandin.***—E. B. Day. ***Independence.***—E. M. Stayton. ***Kansas City.***—R. C. Barnett, F. G. Cudworth, C. P. Moss, C. W. Noble, H. K. Seltzer, H. P. Treadway, H. von Unwerth. ***Lawson.***—A. I. Campbell. ***Pacific.***—L. Highley. ***St. Louis.***—W. R. Bascome, J. Y. Bayliss, S. W. Bowen, W. G. Brenneke, G. W. Corrigan, E. B. Fay, J. T. Garrett, R. P. Garrett, C. Hill, W. A. Hunicke, R. McCulloch, R. Morey, H. J. Pfeifer, J. W. Skelly, W. A. Tyrrell, A. H. Zeller. ***Utica.***—W. O. Galbreath.

Juniors.—***Cameron.***—F. L. Wilcox. ***Columbia.***—A. R. Eitzen. ***Kansas City.***—E. E. Howard, C. A. Neal, H. F. Taylor. ***St. Joseph.***—H. C. Westover. ***St. Louis.***—E. C. Constance, E. C. Dicke, A. P. Greensfelder, H. E. Grimm, J. T. Lillich, H. C. T. Toensfeldt.

MONTANA. Total Membership, 9.

Members.—***Billings.***—S. K. Smith. ***Bozeman.***—E. C. Kinney. ***Butte.***—E. Carroll, E. H. Wilson. ***Helena.***—N. H. Gerry, Jr. ***Ruby.***—J. Baier.

Associate Members.—***Butte.***—C. D. Vail. ***Glendive.***—F. E. Weymouth. ***Red Lodge.***—C. F. Brenn.

NEBRASKA. Total Membership, 10.

Members.—***Kearney.***—C. W. Gibbs. ***Omaha.***—G. Adgate, W. A. Aycrigg, A. Rosewater. ***South Omaha.***—W. S. King.

Associate Members.—***Hastings.***—J. R. Fain. ***Omaha.***—H. A. Holdrege, A. C. Koenig. ***Valentine.***—N. B. Sweitzer.

Juniors.—***Falls City.***—J. A. Crook.

NEVADA. Total Membership, 2.

Associate Members.—***Leetville.***—H. T. Paterson.

Associates.—***Hazen.***—A. V. Saph.

NEW HAMPSHIRE. Total Membership, 11.

Members.—***Derry.***—J. C. Chase. ***Little Boar's Head.***—W. H. Jaques. ***Manchester.***—H. A. Herrick. ***Nashua.***—A. W. Dean. ***Portsmouth.***—E. H. Brownell, L. E. Gregory, L. Treadwell.

Associate Members.—***Lakeport.***—W. Nelson.

Associates.—***Hanover.***—R. Fletcher, J. V. Hazen, J. L. Mann.

NEW JERSEY. Total Membership, 85.

Members.—***Ampere.***—S. S. Wheeler. ***Atlantic City.***—K. Allen. ***Atlantic Highlands.***—W. S. Auchincloss. ***Bayonne.***—F. H. Baldwin. ***Bogota.***—St. J. Clarke. ***Bound Brook.***—H. M. Herbert. ***Bridgeton.***—O. Smith.

Camden.—H. C. Felton, De C. May. ***Edgewater.***—R. L. Crump. ***Elizabeth.***—A. I. Frye, W. H. Luster, Jr. ***Englewood.***—H. Ropes. ***Flanders.***—C. G. Force. ***Glenridge.***—A. H. Tyson. ***Hoboken.***—G. Devin, T. H. McCann. ***Jersey City.***—M. L. Gardner, E. W. Harrison, J. O. Osgood. ***Newark.***—W. P. Field, H. A. Hickok, G. Lehlbach, J. Owen, M. R. Sherrerd. ***Passaic.***—M. R. Strong, C. R. Wise. ***Paterson.***—G. H. Blakeley, J. W. Ferguson, E. Le B. Gardiner. ***Plainfield.***—M. A. Zook. ***Princeton.***—V. A. Harris, C. McMillan. ***Summit.***—C. P. Bassett. ***Tenafly.***—C. Paine. ***Trenton.***—C. E. Hewitt, E. G. Spilsbury. ***Upper Montclair.***—C. A. Mead.

Associate Members.—***Arlington.***—W. S. Logan. ***Constable Hook.***—P. P. Farley. ***Elizabeth.***—J. L. Bauer, C. P. Bonnett, J. H. Granbery. ***Hoboken.***—W. F. Whittemore. ***Jersey City.***—H. G. Burrowes, F. E. Ferris, R. H. Keays, J. P. McLean, N. D. Wortendyke. ***Montclair.***—F. Rosenberg. ***Moorestown.***—H. Conrow. ***Newark.***—L. A. Robb, M. N. Shoemaker. ***Oradell.***—E. G. Manahan. ***Paterson.***—C. W. Bance, J. H. Cook, A. W. Cuddeback. ***Rahway.***—J. J. Vail. ***Red Bank.***—T. H. Grant. ***Summit.***—F. A. Snyder. ***Trenton.***—N. A. K. Bugbee, L. Focht, I. Harby.

Associates.—***Bound Brook.***—J. I. Livingston. ***East Orange.***—J. A. Dailey. ***Newark.***—L. F. Braine. ***Princeton.***—H. S. S. Smith, F. N. Willson.

Juniors.—***Atlantic City.***—J. H. Decker, C. J. Myers. ***Bernardsville.***—J. H. Stiger, Jr. ***East Orange.***—J. A. Clark, Jr. ***Jersey City.***—H. Bouton, A. Hamill, Jr., H. P. McDonald, A. W. Roberts. ***Newark.***—G. E. J. Pistor, S. A. Stephenson, Jr. ***Paterson.***—T. Merriman, H. S. Speidel. ***Princeton.***—H. A. Harris. ***West Orange.***—B. L. Williams, Jr.

Fellows.—***Montclair.***—H. C. Meyer. ***New Milford.***—H. G. Darwin. ***Paterson.***—J. Watson.

NEW MEXICO. Total Membership, 4.

Members.—***Albuquerque.***—A. S. Riffle. ***Carlsbad.***—B. M. Hall. ***Roswell.***—W. M. Reed.

Associate Members.—***Carlsbad.***—E. W. Myers.

NEW YORK. Total Membership, 965.

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Members.—***Albany.***—H. C. Allen, H. Andrews, E. A. Bond, G. P. Hilton, W. B. Landreth, H. C. Parsons, C. F. Stowell, A. H. Sutermeister, E. A. Touceda. ***Amsterdam.***—F. E. Crane. ***Ballston.***—H. M. Geer. ***Binghamton.***—C. E. Webster. ***Brooklyn.***—H. R. Asserson, H. C. Baird, V. B. Bergen, J. C. Brackenridge, I. M. de Varona, C. L. Fitch, W. G. Ford, E. J. Fort, J. B. French, W. H. Gahagan, C. R. Grimm, W. R. Hill, R. C. Hollyday, G. Kaufman, H. C. Keith, E. Klapp, G. Leverich, A. McLean, A. T. Mosman, G. W. Plympton, S. R. Probasco, R. Ridgway, N. Roberts, C. B. Rowland, C. L. Rowland, T. F. Rowland, Jr., G. Sergeant, Jr., G.

S. Skilton, C. W. Smith, J. F. Sorzano, C. W. Staniford, J. Strachan, G. A. Tibbals, S. G. Tibbals, G. W. Tillson, B. M. Wagner. ***Buffalo.***—F. M. Ashmead, F. V. E. Bardol, G. B. Bassett, C. C. Conkling, G. S. Field, S. J. Fields, G. S. Gatchell, F. V. Greene, E. B. Guthrie, W. A. Haven, E. Hayes, S. T. M. B. Kielland, L. H. Knapp, H. L. Lyon, C. M. Morse, C. R. Neher, J. C. Quintus, G. A. Ricker, T. G. Smith, C. H. Tutton, J. Van der Hoek, E. F. Van Hoesen, G. W. Vaughan, J. F. Witmer. ***Catskill.***—C. H. Van Orden. ***Cherry Valley.***—A. B. Cox. ***Coeymans.***—A. H. Blaisdell. ***Cohoes.***—E. Hayes. ***Croton-on-Hudson.***—J. Breuchaud. ***Dansville.***—E. T. Scovill. ***Dunkirk.***—C. E. Hequembourg. ***Elmira.***—E. E. Buchanan, W. W. Cole. ***Fishkill.***—O. W. Barnes. ***Flushing.***—G. A. Roullier. ***Ft. Terry.***—F. W. LaForge. ***Geneseo.***—J. Young. ***Geneva.***—C. T. Church, S. W. Hayes. ***Glens Falls.***—W. W. Maclay. ***Groton.***—E. A. Landon. ***Hastings-on-Hudson.***—L. L. Buck. ***Hillburn.***—W. B. Lee. ***Hudson.***—H. K. Bishop. ***Irvington.***—W. Katte. ***Islip.***—E. R. Smith. ***Ithaca.***—C. L. Crandall. ***Jamaica.***—R. Evans, J. J. McLaughlin. ***Jamestown.***—E. C. Burns, F. L. Chase. ***Katonah.***—F. K. Betts, W. H. Sears. ***Kingston.***—E. B. Codwise. ***Lincoln Park.***—G. T. Keith. ***Linoleumville.***—D. N. Melvin. ***Little Falls.***—E. T. E. Lansing. ***Long Island City.***—L. C. L. Smith. ***Mechanicsville.***—R. P. Bloss. ***Middletown.***—E. Canfield, C. E. Knickerbocker. ***New Brighton.***—W. R. Hillyer, J. D. Van Buren. ***Newburgh.***—E. Garrison. ***New Hartford.***—A. M. Scripture. ***New Rochelle.***—R. M. Berrian, H. Crosby. ***New York City.***—F. W. Abbot, A. V. Abbott, W. I. Aims, C. H. Allen, W. A. Allen, R. F. Almirall, G. Aus, W. E. Austin, H. N. Babcock, G. I. Bailey, W. E. Baker, W. J. Baldwin, G. S. Baxter, R. J. Beach, W. E. Belknap, F. W. Bennett, J. A. Bensel, L. DeC. Berg, W. G. Berg, F. O. Blackwell, J. Bogart, V. G. Bogue, A. P. Boller, R. P. Bolton, A. L. Bowman, J. H. Brace, G. W. Bramwell, J. A. Briggs, A. G. Brinckerhoff, H. W. Brinckerhoff, C. O. Brown, T. E. Brown, W. P. Brown, J. L. Brownlee, C. W. Bryan, C. W. Buchholz, R. S. Buck, F. A. Burdett, W. H. Burr, A. Carr, G. W. Catt, W. A. Cattell, R. H. Chambers, T. F. Chappell, J. E. Childs, G. L. Christy, G. C. Clarke, A. Coffin, T. A. Coffin, A. L. Colby, H. J. Cole, F. Collingwood, D. C. N. Collins, R. G. Collins, Jr., C. B. Comstock, H. Constable, C. H. Cooke, S. E. Coombs, T. Cooper, G. B. Cornell, A. B. Corthell, E. L. Corthell, A. Craven, W. W. Crehore, R. W. Creuzbaur, J. J. R. Croes, F. Crowell, A. H. Dakin, Jr., J. V. Davies, C. Davis, C. H. Davis, J. P. Davis, W. F. Dennis, S. L. F. Deyo, E. Diebitsch, J. B. Duncklee, H. F. Dunham, E. W. Eckert, O. M. Eidlitz, O. Erlandsen, L. H. Evans, H. H. Farnum, H. Farrington, G. R. Ferguson, H. Fernstrom, F. D. Fisher, P. D. Ford, J. Forgie, E. H. Foster, J. D. Fouquet, G. B. Francis, J. H. Fuertes, G. W. Fuller, W. B. Fuller, L. P. Gaston, M. Gay, G. Gibbs, G. E. Gifford, R. Giles, H. P. Gillette, W. C. Gotshall, W. T. Gould, C. H. Graham, J. M. Graham, J. H. Gray, G. S. Greene, Jr., E. Griffin, C. A. Hague, S. S. Haight, H. S. Haines, J. C. Hallsted, W. G. Hamilton, G. E. Harding, C. L. Harrison, W. J. Haskins, C. H. Haswell,

A. Haviland, G. S. Hayes, R. S. Hayes, A. Hazen, D. W. Hemming, C. W. Hendrick, R. Hering, C. Herschel, V. H. Hewes, W. Hildenbrand, G. Hill, A. L. A. Himmelwright, S. W. Hoag, Jr., H. W. Hodge, O. Hoff, N. B. K. Hoffman, R. H. Hood, D. L. Hough, O. E. Hovey, H. J. Howe, A. C. Humphreys, C. W. Hunt, R. C. Hunt, C. T. Hutchinson, J. C. Irwin, C. M. Jacobs, G. A. Just, W. D. Kelley, W. W. Kenly, J. J. Kennedy, P. S. King, T. P. Kinsley, J. M. Knap, J. A. Knighton, E. Kuichling, H. A. La Chicotte, R. Lamb, J. Langton, F. McD. Leavitt, M. Lewinson, N. P. Lewis, J. W. Lieb, Jr., G. Lindenthal, J. A. Lockwood, T. J. Long, H. Loomis, L. F. Loree, H. C. Lowrie, A. Lucius, J. Lundie, C. Macdonald, J. E. McKay, A. R. McKim, T. J. McMinn, G. W. McNulty, H. H. Marden, Jr., K. L. Martin, W. Martin, J. Mayer, A. G. Menocal, W. C. Merryman, T. C. Meyer, F. Miller, H. C. Miller, R. P. Miller, S. Miller, C. H. Moore, D. E. Moran, M. Moulton, C. H. Myers, O. F. Nichols, A. Noble, E. P. North, P. E. Nostrand, E. E. Olcott, A. E. Olmsted, LaF. Olney, S. B. Opdyke, Jr., J. F. O'Rourke, J. C. Ostrup, R. G. Packard, A. McC. Parker, C. J. Parker, W. C. Parmley, H. de B. Parsons, W. B. Parsons, T. Paschke, F. S. Pearson, G. H. Pegram, H. H. Porter, G. B. Post, H. W. Post, H. W. Potter, W. A. Pratt, H. G. Prout, C. T. Purdy, E. R. Quinby, H. de Raasloff, C. W. Raymond, W. B. Reed, A. H. Renshaw, G. S. Rice, A. A. Robbins, E. P. Roberts, A. A. Robinson, J. C. L. Rogge, E. J. Rosencrans, E. S. Safford, W. L. Saunders, M. E. Schmidt, H. B. Seaman, P. A. Seurot, G. F. Simpson, F. W. Skinner, A. Smith, A. M. Smith, J. W. Smith, T. E. Snook, C. H. Snow, G. D. Snyder, C. Sooysmith, S. Spencer, H. M. Sperry, A. N. Spooner, F. J. Sprague, J. H. Staats, R. P. Staats, R. B. Stanton, M. G. Starrett, D. McN. Stauffer, I. A. Stearns, E. W. Stern, J. M. Stewart, L. B. Stillwell, G. C. Stoddard, C. R. Suter, G. W. Swinburne, E. Thacher, G. E. Thomas, H. C. Thompson, S. C. Thompson, G. H. Thomson, J. Thomson, T. K. Thomson, R. H. Tingley, A. T. Tomlinson, F. M. Towl, S. Towle, L. L. Tribus, W. G. Triest, A. W. Trotter, R. F. Tucker, G. R. Tuska, A. S. Tuttle, C. C. Upham, J. G. Van Horne, E. B. Van Winkle, M. A. Viele, C. B. Vorce, M. Waddell, J. C. Wait, C. I. Walker, J. H. Wallace, C. D. Ward, J. Waterhouse, S. C. Weiskopf, J. H. Wells, S. Whinery, J. G. White, W. H. Wiley, W. J. Wilgus, F. S. Williamson, S. B. Williamson, J. B. Wright, H. W. York.

Niagara Falls.—W. A. Brackenridge, W. C. Johnson, W. McCulloh, A. H. Van Cleve. ***Ossining.***—C. S. Gowen. ***Oswego.***—J. C. Churchill, Jr., W. P. Judson. ***Oxford.***—J. H. Edwards. ***Port Chester.***—F. S. Odell, H. M. Rood. ***Rochester.***—J. F. Alden, LeG. Brown, R. Cartwright, E. A. Fisher, J. M. Floesch, J. H. Grant, C. Hansel, W. E. Hoyt, J. Y. McClintock, W. N. Radenhurst, G. W. Rafter, A. J. Rockwood, J. N. Tubbs. ***Rome.***—C. C. Hopkins, E. Low. ***Scarsdale.***—S. H. Woodard. ***Schenectady.***—J. L. FitzGerald, G. S. Hook, J. M. Jackson, O. H. Landreth, W. B. Potter, L. W. Tucker. ***Smith's Landing.***—J. W. Kittrell. ***Syracuse.***—W. B. Cogswell, C. O. McComb, T. H. Mather, H. Soule. ***Tahawus.***—J. MacNaughton. ***Tarrytown.***—D. S. Merritt. ***Troy.***—J. Burden, J. A.

Burden, E. R. Cary, D. M. Greene, E. L. Grimes, J. A. Powers, P. C. Ricketts. ***Utica.***—W. S. Bacot, C. L. Johnson, P. Schultze, H. Seymour, R. W. Sherman. ***Waterford.***—J. Knickerbacker. ***Watertown.***—F. A. Hinds. ***West New Brighton.***—C. C. King, H. P. Morrison, T. S. Oxholm. ***West Point.***—G. J. Fiebeger, M. M. Patrick. ***White Plains.***—G. B. Burbank, J. M. Farley, F. W. Watkins, E. Wegmann. ***Yonkers.***—W. H. Baldwin, S. L. Cooper.

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Juniors.—***Wilmington.***—W. S. Hanna.

OHIO. **Total Membership, 111.**

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S. T. Wellman, C. H. Wright, P. K. Yates. ***Columbus.***—C. A. Alderman, F. W. Blackford, F. H. Eno, J. Griggs, G. W. Lilly, S. W. Robinson. ***Dayton.***—H. E. Talbott. ***Elyria.***—W. H. Searles. ***Glenville.***—A. J. Himes. ***Home City.***—B. F. Thomas. ***Mt. Vernon.***—I. M. Wolverton. ***Piqua.***—A. W. French. ***Sandusky.***—C. A. Judson. ***Steubenville.***—T. H. Loomis. ***Toledo.***—W. T. Blunt, C. Buxton, C. L. Gates, A. L. Mills, F. T. Oakley, H. E. Riggs, M. J. Riggs. ***Zanesville.***—J. K. Geddes.

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Associates.—***Cleveland.***—H. W. King, W. P. Palmer, C. B. Stowe. ***Dayton.***—H. Lowe.

Juniors.—***Cincinnati.***—E. A. Gast, O. E. Selby. ***Cleveland.***—L. S. Benton, R. J. Mansfield. ***Columbus.***—L. Pearse, H. S. Williams. ***Toledo.***—W. G. Clark. ***Wellsville.***—G. Scott.

OKLAHOMA. Total Membership, 3.

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Juniors.—***Lawton.***—L. E. Johnson, G. L. Warner.

OREGON. Total Membership, 15.

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D. T. Corning, V. S. Doebler, L. R. Gifford, R. M. Greene. ***Lewisburg.***—W. Frick. ***New Castle.***—J. B. Cameron, T. A. Gilkey, E. G. Lane. ***Pencoyd.***—A. Hirst. ***Philadelphia.***—W. P. Boright, E. Clark, H. Coleman, C. E. Collins, J. S. Ely, S. E. Fairchild, Jr., W. H. Ford, B. Franklin, F. L. Garrison, J. A. Kelley, E. F. Kenney, B. B. Lathbury, H. W. Latta, W. T. Lyle, W. A. Moncure, H. V. V. Osbourn, M. R. Pugh, E. M. Scofield, T. N. Spencer, S. M. Swaab, J. A. Vogleson, C. B. Voynow, J. C. Wagner, P. H. Wilson. ***Phœnixville.***—C. H. Deans, S. Gowen. ***Pittsburg.***—L. J. Affelder, E. B. Baker, J. E. Banks, G. T. Barnsley, J. C. Barr, M. Burden, G. H. Burgess, G. H. Clapp, F. E. Field, H. A. Greene, G. Gudmundsson, M. D. Hayes, R. G. Hengst, J. B. Leeper, C. E. McCoy, W. M. Rosewater, C. L. E. Schenk, L. H. Shoemaker, J. L. Stuart, G. C. Urquhart, W. M. White, W. Whited, T. H. Wiggin, W. D. Wiggins, T. J. Wilkerson. ***Saltsburg.***—A. Smith. ***Steelton.***—S. W. Bradshaw, E. De Witt, E. T. Morrison. ***Warren.***—De F. A. Wheelock. ***Watsontown.***—C. J. Hogue. ***York.***—T. Horton.

Associates.—***Allentown.***—C. M. Saeger. ***Chester.***—S. G. Comfort. ***Erie.***—W. C. Olds. ***Philadelphia.***—W. H. Barnes, S. Bent, G. Burnham, Jr., L. V. Clark, W. R. Copeland, W. G. Hartranft, R. W. Lesley, J. P. A. Maignen, J. C. Trautwine, Jr., J. W. Zipperlein. ***Pittsburg.***—W. L. Abbott, J. A. Huston. ***South Bethlehem.***—S. M. Turrill. ***Steelton.***—G. W. Parsons.

Juniors.—***Allentown.***—F. A. Hausman. ***Ambridge.***—R. Murray. ***Aspinwall.***—E. D. Harshbarger, A. U. Whitson, C. L. Wilcox. ***Bangor.***—W. R. Jordan. ***Beaver.***—W. H. Chadbourn, Jr., L. D. Cornish. ***Bethlehem.***—F. R. Schmid. H. R. St. A. Walters. ***Canonsburg.***—P. A. Blackwell. ***Dravosburg.***—G. R. Sinnickson. ***Galeton.***—J. H. Burgoyne, Jr. ***Greenville.***—F. R. S. Layng, W. H. Waugh. ***Harrisburg.***—R. R. Fernow. ***Lancaster.***—J. H. Wickersham. ***Philadelphia.***—W. Fisher, W. S. Harding, H. C. Ives, A. S. Kibbe, H. McBurney, L. Merz, J. G. Shryock, W. P. Taylor, F. M. Weaver. ***Phoenixville.***—A. H. Birks, C. W. McCornack. ***Pittsburg.***—C. G. Dunnells, L. L. Hunter, E. N. Hunting, C. S. Lambie, A. H. Nelson, G. T. Paraschos, E. M. Rhett, D. Y. Swaty, H. W. Underwood, F. W. Witherell. ***Port Griffith.***—J. H. Brillhart. ***Sewickley.***—G. J. Walker. ***South Bethlehem.***—S. A. Becker, R. W. Gay. ***Vilas.***—J. E. Porter. ***Wilkesbarre.***—C. Enzian. ***Wilkinsburg.***—C. L. Fox.

Fellows.—***Philadelphia.***—E. W. Clark.

RHODE ISLAND. Total Membership, 31.

Members.—***Arlington.***—H. N. Francis. ***Central Falls.***—W. F. Keene. ***East Providence.***—J. H. Armington. ***Newport.***—J. P. Cotton, W. H. Lawton. ***Pawtucket.***—G. A. Carpenter. ***Providence.***—W. D. Bullock, C. F. Chase, O. F. Clapp, J. V. Dart, J. R. Freeman, S. M. Gray, W. H. Knight, G. H. Leland, O. P. Sarle, E. W. Shedd, J. H. Shedd, H. E. Sherman, W. H. G. Temple, E. B. Weston. ***Woonsocket.***—J. W. Ellis.

Associate Members.—*Newport.*—G. A. McKay. *Providence.*—J. S. Browne, J. E. Hill, P. S. Perkins, E. W. Ross, W. E. Spear, I. S. Wood, W. B. Wood. *Westerly.*—T. McKenzie.
Juniors.—*Providence.*—A. H. Blanchard.

SOUTH CAROLINA. Total Membership, 11.

Members.—*Charleston.*—J. P. Allen, J. W. G. Walker. *Georgetown.*—R. Whitford. *Greenville.*—J. E. Sirrine. *Moultrieville.*—W. A. Leland. *Spartanburg.*—W. B. W. Howe.
Associate Members.—*Charleston.*—J. H. Dingle, W. M. Smith. *Greenville.*—P. A. Dallis. *Toney Creek.*—C. M. Pritchett.
Associates.—*Spartanburg.*—G. O. Tenney.

SOUTH DAKOTA. Total Membership, 2.

Members.—*Sturgis.*—S. H. Lea.
Juniors.—*Deadwood.*—F. A. Sherwood.

TENNESSEE. Total Membership, 32.

Members.—*Chattanooga.*—J. C. Guild, B. Thompson, J. M. G. Watt. *Jackson.*—H. P. Farrar. *Knoxville.*—W. W. Carson. *Memphis.*—A. L. Dabney, W. M. Gardner, W. Gerig, W. W. Hayden, L. Y. Kerr, E. W. V. C. Lucas. *Nashville.*—A. J. Dyer, W. F. Foster, E. C. Lewis, C. A. Locke, H. McDonald, W. N. McDonald, T. H. Tutwiler, J. S. Walker, F. S. Washburn.
Associate Members.—*Chattanooga.*—E. E. Betts, W. H. Converse. *Dossetts.*—C. E. Bright. *Knoxville.*—V. D. Hite-Smith. *Memphis.*—R. A. Given, F. H. Hilliard, F. W. Lepper, J. A. Omberg, Jr., H. N. Pharr. *Nashville.*—G. Jackson.
Juniors.—*Memphis.*—H. N. Howe. *Nashville.*—W. D. Rhea.

TEXAS. Total Membership, 36.

Members.—*Athens.*—D. A. Poynor. *Austin.*—T. U. Taylor. *Corsicana.*—H. G. Johnston. *Dallas.*—C. B. Davis, M. S. Hasie, O. H. Lang, B. S. Wathen. *El Paso.*—J. L. Campbell, W. W. Follett. *Fort Worth.*—J. B. Hawley, W. B. King. *Galveston.*—C. F. W. Felt, E. M. Hartrick, H. C. Ripley, D. A. Watt. *Marshall.*—H. DeW. Smith. *San Antonio.*—R. H. Gresham. *Tyler.*—M. L. Lynch. *Victoria.*—E. J. Nichols.
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Juniors.—*Cleburne.*—S. McCrory. *Eagle Lake.*—T. L. Smith, Jr. *Fort Worth.*—C. H. Zane-Cetti, B. G. Leake. *Galveston.*—N. T. Blackburn, C. J. Howard, C. G. Wells. *Houston.*—D. M. Duller, R. D. Parker.

UTAH. **Total Membership, 16.**

Members.—***Provo.***—P. N. Nunn. ***Salt Lake City.***—F. E. Baxter, A. F. Doremus, G. H. Robinson.

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Associates.—***Salt Lake City.***—R. R. Lyman.

Juniors.—***Ogden.***—L. B. Spencer. ***Salt Lake City.***—H. S. Kleinschmidt, W. J. Spalding, W. E. Wilson.

VERMONT. **Total Membership, 6.**

Members.—***Burlington.***—F. O. Sinclair. ***Hartland.***—H. Harding. ***St. Johnsbury.***—D. Williams. ***Thetford Center.***—A. H. Porter.

Associate Members.—***Burlington.***—F. O. Dufour. ***St. Albans.***—R. H. P. Ford.

VIRGINIA. **Total Membership, 46.**

Members.—***Blacksburg.***—L. S. Randolph. ***Houston.***—H. C. Derrick. ***Leesburg.***—H. H. Trundle. ***Lexington.***—D. C. Humphreys. ***Lynchburg.***—A. S. Ives, C. G. Williams. ***Mineral.***—A. P. Man. ***Newport News.***—W. A. Post. ***Norfolk.***—E. B. Noyes, F. Thompson. ***Petersburg.***—J. W. Hays, C. A. Miner. ***Portsmouth.***—B. F. Mackall. ***Richmond.***—D. Axtell, W. E. Cutshaw, H. Frazier, C. W. Haines, E. T. D. Myers, E. T. D. Myers, Jr., F. W. Scarborough, H. D. Whitcomb, S. H. Yonge. ***Rio.***—C.M. Bolton. ***Roanoke.***—C. S. Churchill, W. W. Coe, E. A. Frink, C. C. Wentworth. ***Staunton.***—F. H. Lewis. ***Wenonda.***—J. A. Hall, A. V. Sims. ***Zion.***—G. H. Browne.

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Associates.—***Blackstone.***—E. B. Fishburne, Jr. ***Norfolk.***—E. L. DuBarry.

Juniors.—***Roanoke.***—C. F. Class, J. E. Crawford.

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Associate Members.—***Bremerton.***—A. C. Lewerenz. ***Pullman.***—W. J. Roberts. ***Seattle.***—L. S. Oakes.

Associates.—***Seattle.***—A. H. Fuller, O. H. P. La Farge.

Juniors.—***Fort Flagler.***—H. J. M. Baker. ***Seattle.***—S. B. Hill, C. C. More. ***Spokane.***—P. W. Price. ***Tacoma.***—A. McL. Hawks.

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Members.—***Austen.***—E. M. Kenly. ***Berkeley Springs.***—B. S. Randolph. ***Bluefield.***—M. J. Caples. ***Charleston on Kanawha.***—A. M. Scott. ***Clarksburg.***—A. C. Dennis, T. M. Jackson. ***Clay.***—W. D. Janney. ***New Cumberland.***—C. E. Grafton. ***Parkersburg.***—S. D. Brady, W. McL. Hall. ***Ronceverte.***—H. Pierce. ***Thomas.***—J. F. Healy. ***Wellsburg.***—L. S. Johnson. ***Wheeling.***—C. Humphreys, G. A. Zinn.

Associate Members.—***Beckley.***—C. P. Howard. ***Boxley.***—J. L. Dillard. ***Davis.***—C. B. Scott. ***Gary.***—H. N. Eavenson. ***Kenova.***—W. P. Wiltsee. ***Parkersburg.***—J. P. Horstman, J. M. Jackson. ***Wheeling.***—R. Hazlett, A. W. Thompson.

Associates.—***Charleston.***—W. D. Sell.

WISCONSIN. Total Membership, 21.

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Associates.—***Milwaukee.***—J. R. Berthelet. ***North Milwaukee.***—T. R. Brown.

Juniors.—***Milwaukee.***—G. E. Kahn.

Fellows.—***Milwaukee.***—S. M. Green.

WYOMING. Total Membership, 10.

Members.—***Cheyenne.***—C. T. Johnston, H. B. Patten. ***Cody.***—J. Ahern, C. P. Williams. ***Evanston.***—W. Newbrough. ***Meeteetse.***—B. Moody. ***Sheridan.***—E. Gillette.

Associate Members.—***Cheyenne.***—E. Stenger. ***Cody.***—G. W. Zorn.

Juniors.—***Fort D. A. Russell.***—M. L. Ireland.

CENTRAL AMERICA.

COSTA RICA. Total Membership, 1.

Members.—***San Jose.***—T. H. Barnes.

GUATEMALA. Total Membership, 1.

Members.—***Sanarate.***—S. F. Shaw.

NICARAGUA. Total Membership, 2.

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PANAMA. Total Membership, 13.

Members.—*Ancon.*—J. F. Wallace. *Bohio.*—H. F. Dose. *Cristobal.*—E. W. Clarke, C. List. *Culebra.*—W. E. Dauchy, W. B. Ruggles.
Associate Members.—*Ancon.*—C. E. Davis, A. C. Harper. *Bocas-del-Toro.* S. H. Scharschmidt. *Bos Obispo.*—B. Ehle. *Gatun.*—R. B. Manter. *Panama.*—R. M. Arango.
Associates.—*Ancon.*—W. J. Karner.

SALVADOR. Total Membership, 2.

Members.—*Santa Ana.*—A. J. Scherzer.
Associate Members.—*San Salvador.*—G. S. Walsh.

SOUTH AMERICA.

ARGENTINE REPUBLIC. Total Membership, 5.

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Associate Members.—*Buenos Aires.*—J. Abella, P. Smith. *Mendoza.*—J. J. Corti.

BRAZIL. Total Membership, 1.

Members.—*Alagoinhas.*—M. de Teive e Argollo.

CHILI. Total Membership, 2.

Members.—*Valparaiso.*—E. Budge, E. B. Budge.

COLOMBIA. Total Membership, 2.

Members.—*Barranquilla.*—C. P. Yeatman.
Associate Members.—*Cali.*—H. J. Eder.

PERU. Total Membership, 3.

Members.—*Lima.*—J. H. Johnston.
Associate Members.—*Cerro de Pasco.*—A. B. Bentzon.
Juniors.—*Lima.*—C. W. Sutton.

WEST INDIA ISLANDS.

CUBA. Total Membership, 15.

Members.—*Guantanamo.*—W. G. McConnel. *Havana.*—E. J. Balbin, J. A. McNicol, Y. Polledo, M. A. Smith. *Santiago de Cuba.*—E. J. Chibas.
Associate Members.—*Daiquiri.*—G. W. Pfeiffer. *Guantanamo.*—A. S. Hobby. *Havana.*—T. L. Huston, A. E. Mesa, J. R. Villalon. *Mayari.*—E. W. McCormack.

Juniors.—***Daiquiri.***—E. M. Holmes. ***Havana.***—J. M. Babé. ***Trinidad.***—G. G. Fischer.

PORTO RICO. Total Membership, 3.

Associate Members.—***San Juan.***—J. M. Belknap, T. J. Carlile, J. V. Rockwell.

TRINIDAD. Total Membership, 1.

Members.—***Port of Spain.***—M. W. Cooley.

EUROPE.

AUSTRIA. Total Membership, 3.

Members.—***Trieste.***—F. Slataper. ***Vienna.***—C. Redlich, E. A. Ziffer.

FRANCE. Total Membership, 2.

Corresponding Members.—***Paris.***—E. Pontzen.
Members.—***Paris.***—E. T. Quinette de Rochemont.

GERMANY. Total Membership, 2.

Corresponding Members.—***Hamburg.***—C. O. Gleim.
Members.—***Deutsch-Eylau.***—R. Bassel.

GREAT BRITAIN. Total Membership, 38.

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Members.—***Carlisle, Eng.***—G. J. Bell. ***Edinburgh, Scot.***—J. H. Cunningham. ***Freshford, Eng.***—E. H. Stone. ***Glasgow, Scot.***—D. A. Matheson. ***Haslemere, Eng.***—E. H. Hurry. ***London, Eng.***—R. Ballard, R. T. Bayliss, J. R. Bell, W. H. Booth, J. R. Chapman, G. E. Church, A. N. Connett, J. F. Flagg, A. G. Glasgow, K. P. Hawksley, J. W. Jacomb-Hood, C. Kadono, J. A. McDonald, O. J. Marstrand, H. S. Maxim, E. W. Moir, J. P. O'Donnell, E. B. Thornhill, T. D. Whistler, M. E. Yeatman. ***Middlesbrough, Eng.***—A. M. Mosscrop, J. E. Swanker. ***Newcastle-upon-Tyne, Eng.***—J. M. Moncrieff. ***Taunton, Eng.***—T. Michell.
Associate Members.—***Liverpool, Eng.***—G. C. Kenyon. ***London, Eng.***—A. J. Campbell, H. Hardy. ***Widnes, Eng.***—P. M. Pritchard.
Associates.—***London, Eng.***—M. Hunsiker.
Juniors.—***London, Eng.***—R. Tappan.

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NORWAY. Total Membership, 1.

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Associate Members.—***St. Petersburg.***—S. P. Maximoff.

SPAIN. Total Membership, 1.

Members.—***Barcelona.***—J. Tintorer y Giberga.

SWITZERLAND. Total Membership, 1.

Members.—***Zurich.***—K. E. Hilgard.

AFRICA.

Total Membership, 7.

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Associate Members.—***Bethlehem, Orange River Colony.***—W. M. Homan. ***Bulawayo, Rhodesia.***—C. Corner. ***Cape Town, Cape Colony.***—G. A. Lund. ***Johannesburg, Transvaal.***—E. Hazard, A. W. Stockett.

ASIA.

CHINA. Total Membership, 9.

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Associate Members.—***Chinkiang.***—T. A. Ross. ***Tientsin.***—T. J. Bourne.
Juniors.—***Canton.***—T. C. S. Yen.

COREA. Total Membership, 1.

Associate Members.—***Seoul.***—B. C. Donham.

INDIA. Total Membership, 9.

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Associate Members.—***Bankipore.***—E. Brook-Fox. ***Bombay.***—G. F. F. Osborne. ***Calcutta.***—J. C. Mills, W. E. Pincombe. ***Munaar.***—R. F. Thorp. ***Raneeganj.***—R. H. Sears. ***Trichur.***—G. E. Browning.

JAPAN. Total Membership, 11.

Members.—***Kobe.***—J. Yamaguchi. ***Moji.***—M. Sengoku. ***Osaka.***—K. Murakami. ***Tokyo.***—S. Kondo, T. Kondo, M. Otagawa, N. Shiraishi, T. Tsuji.
Associate Members.—***Niigata.***—Y. Wada.
Associates.—***Kyoto.***—K. Futami.
Juniors.—***Tokyo.***—S. Fujino.

PHILIPPINE ISLANDS. Total Membership, 17.

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Associate Members.—***Cavite.***—A. L. Parsons. ***Lucena.***—H. C. Humphrey. ***Manilla.***—A. Gideon, S. D. Rockenbach.
Juniors.—***Manila.***—E. M. Adams, A. F. Armstrong, W. C. Bunnel.

STRAITS SETTLEMENTS. Total Membership, 1.

Members.—***Singapore.***—S. Tomlinson.

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Total Membership, 20.

Members.—***Adelaide, Australia.***—A. B. Moncrieff. ***Brisbane, Australia.***—J. B. Henderson, A. W. Jardine. ***Christchurch, New Zealand.***—C. J. R. Williams. ***Mareeba, Australia.***—A. S. Frew. ***Melbourne, Australia.***—T. W. Fowler, W. C. Kernot, H. C. Mais. ***Northam, Australia.***—H. Serjeant. ***Perth, Australia.***—J. S. Walker. ***Randwick, Australia.***—R. Watkins. ***Sydney, Australia.***—P. Allan, J. W. Grimshaw, W. H. Warren.
Associate Members.—***Adelaide, Australia.***—H. F. Nichols. ***Chelmer, Australia.***—R. D. A. Frew. ***Geraldton, Australia.***—H. A. Cresswell. ***Napier, New Zealand.***—W. S. Charlsworth. ***Sydney, Australia.***—H. L. Jones. ***Woollahra, Australia.***—J. I. Haycroft.

ADDRESS UNKNOWN. Total, 11.

Members.—C. McK. Craig.
Associate Members.—F. E. Lane, A. C. Wheatley.
Associates.—E. A. Rogers.
Juniors.—G. W. Enos, C. W. Hall, R. C. Kimball, W. McKeever, W. H. Starr.
Fellows.—E. W. Coit, G. Merritt.

TOTAL MEMBERSHIP, 3 249.

SUMMARY OF GEOGRAPHICAL DISTRIBUTION.

NORTH AMERICA.

CANADA	74	
MEXICO	43	
UNITED STATES.		
Alabama	22	
Alaska	1	
Arizona	9	
Arkansas	10	
California	112	
Colorado	32	
Connecticut	57	
Delaware	11	
District of Columbia	86	
Florida	12	
Georgia	24	
Hawaii	4	
Idaho	7	
Illinois	160	
Indian Territory	4	
Indiana	19	
Iowa	11	
Kansas	16	
Kentucky	27	
Louisiana	28	
Maine	22	
Maryland	43	
Massachusetts	186	
Michigan	55	
Minnesota	45	
Mississippi	12	
Missouri	101	
Montana	9	
Nebraska	10	
Nevada	2	
New Hampshire	11	
New Jersey	85	
New Mexico	4	
New York	965	
North Carolina	5	
Ohio	111	
Oklahoma	3	
Oregon	15	
Pennsylvania	346	
Rhode Island	31	
South Carolina	11	
South Dakota	2	
Tennessee	32	
Carried forward	2 758	117
Brought forward	2 758	117
Texas	36	
Utah	16	
Vermont	6	
Virginia	46	
Washington	23	
West Virginia	26	
Wisconsin	21	
Wyoming	10	2 942

CENTRAL AMERICA.

COSTA RICA	1	
GUATEMALA	1	
NICARAGUA	2	
PANAMA	13	
SALVADOR	2	19

SOUTH AMERICA.

ARGENTINE REPUBLIC	5	
BRAZIL	1	
CHILI	2	
COLOMBIA	2	
PERU	3	13

WEST INDIA ISLANDS.

CUBA	15	
PORTO RICO	3	
TRINIDAD	1	19

EUROPE.

AUSTRIA	3	
FRANCE	2	
GERMANY	2	
GREAT BRITAIN	38	
NETHERLANDS	1	
NORWAY	1	
RUSSIA	4	
SPAIN	1	
SWITZERLAND	1	53

AFRICA.

Total in Africa	7	7

ASIA.

CHINA	9	
COREA	1	
INDIA	9	
JAPAN	11	
PHILIPPINE ISLANDS	17	
STRAITS SETTLEMENTS	1	48

AUSTRALASIA.

Total in Australasia	20	20
Address Unknown	11	11

Total Membership, 3 249.

SUBSCRIBERS TO THE BUILDING FUND, 1881 to 1886.

The names of deceased subscribers to this fund, and of those whose address is unknown, have been omitted from this list, and the names of many living subscribers have, with their consent, also been omitted.

Boston Gas Light Company.....24 West St., Boston, Mass.

Boyd, Charles R.....Wytheville, Va.

Griswold, Frank L..... Cruz del Eje, Cordoba, Argentine Republic.

Maher & Brayton.....Cleveland, Ohio.

Sorzano, Julio F.....33 Broadway, New York City.

Towle, Stevenson.....220 Broadway, New York City.

PAST AND PRESENT OFFICERS

AND YEARS IN WHICH THEY HELD OFFICE.

The figures of the year during which office was held are, to save space, printed without those of the century. In some cases they do not show the year in which office was taken; for instance, an officer whose term extended from November, 1873, to November, 1875, appears in this table as having held office during 1874 and 1875, or 74-75.

The names of deceased members are printed in italics.

Name.	President.	Vice-President.	Secretary.	Treasurer.	Director.
Adams, Julius Walker	74–75	68–73	.....	.....	53, 76
Allen, Horatio	72–73	.....	.....	.....	.....
Archbald, James	.....	.....	.....	.....	87
Becker, Max Joseph	89	.....	.....	.....	.....
Bensel, John Anderson	.....	.....	.....	.....	99–01
Benzenberg, George Henry	.....	01–02	.....	.....	95–97
Bissell, Hezekiah	.....	.....	.....	.....	05
Bogart, John	.....	.....	78–90	76–77, 91–94	73–75
Boller, Alfred Pancoast	.....	.....	70–71	.....	72
Bontecou, Daniel	.....	.....	.....	.....	96–98
Bouscaren, Louis Frederick Gustave	.....	03–04	.....	.....	81
Bowman, Austin Lord	.....	.....	.....	.....	05
Briggs, Josiah Ackerman	.....	.....	.....	.....	01–03
Browne, George Hamilton	.....	.....	.....	.....	95–97
Brush, Charles Benjamin	.....	92–93	.....	.....	88–91
Buchholz, Carl Waldemar	.....	.....	.....	.....	99–01
Buck, Leffert Lefferts	.....	.....	.....	.....	92–94
Buck, Richard Sutton	.....	.....	.....	.....	02–04
Burr, William Hubert	.....	.....	.....	.....	94–96
Carter, Edward Carlos	.....	.....	.....	.....	01–03
Cartwright, Robert	.....	99–00	.....	.....	95–97
Casey, Thomas L.*	.....	.....	.....	.....	82
Chanute, Octave	91	80–81	.....	.....	74–76, 85
Chesbrough, Ellis Sylvester	78	.....	.....	.....	70
Chesbrough, I. C.*	.....	.....	.....	.....	55–67
Clark, Jacob Merrill	.....	72–73	.....	.....	70–71
Clarke, Eliot Channing	.....	.....	.....	.....	89
Clarke, Thomas Curtis	96	71	.....	.....	79

* Resigned.

Name.	President.	Vice-President.	Secretary.	Treasurer.	Director.
Cohen, Mendes	92	90	.....	.....	88
Collingwood, Francis	.....	.....	91-94	.....	73-76
Cooper, Theodore	.....	.....	.....	.....	84-85
Copeland, Charles W.	.....	53-69	.....	.....	.....
Corthell, Elmer Lawrence	.....	89, 93-94	.....	.....	.....
Craighill, William Price†	94	.....	.....	.....	92-93
Craven, Alfred	.....	.....	.....	.....	03-05
Craven, Alfred Wingate	70-71	54-67	.....	.....	53, 68-69, 72-73
Croes, John James Robertson	01	88	.....	78-87	77
Crosby, Benjamin Lincoln	.....	.....	.....	.....	97-99
Crowell, Foster	.....	.....	.....	.....	93-95
Curtis, Fayette Samuel	.....	04-05	.....	.....	95-97
Curtis, William Giddings	.....	.....	.....	.....	90
Davis, Joseph Phineas	.....	84	.....	.....	78, 81-83
Davison, George Stewart	.....	.....	.....	.....	03-05
Deyo, Solomon LeFevre	.....	04-05	.....	.....	98-00
Dresser, George Warren	.....	.....	.....	.....	82
Eads, James Buchanan	.....	82	.....	.....	.....
Ellis, John Waldo	.....	.....	.....	.....	04-05
Ellis, Theodore Grenville	.....	74-77	.....	.....	79
Ely, Theodore Newel	.....	.....	.....	.....	92-93
Endicott, Mordecai Thomas	.....	.....	.....	.....	01-03
Fanning, John Thomas	.....	.....	.....	.....	93-95
Fink, Albert	80	78-79	.....	.....	.....
Fisher, Edwin Augustus	.....	.....	.....	.....	05
FitzGerald, Desmond	99	95-96	.....	.....	92-94
Flad, Henry	86	83	.....	.....	.....
Ford, James K.*	.....	.....	.....	.....	68-69
Forney, Matthias N.*	.....	.....	.....	.....	77
Forsyth, Robert	.....	.....	.....	.....	87
Francis, James Licheno	81	70, 79-80	.....	.....	.....
Frazier, James Lewis	.....	.....	.....	.....	02-04
Freeman, John Ripley	.....	02-03	.....	.....	96-98
Fteley, Alphonse	98	89-91	.....	.....	88
Fuertes, Estevan Antonio	.....	.....	.....	.....	92
Gardiner, Edward	.....	53	54	54	.....
Gillmore, Quincy Adams	.....	.....	.....	.....	76
Gorsuch, Robert B.*	.....	.....	53	53	.....
Gottlieb, Abraham	.....	.....	.....	.....	92-93
Gowen, Charles Sewall	.....	.....	.....	.....	04-05
Graff, Frederic	85	.....	.....	.....	84
Gray, Samuel Merrill	.....	92	.....	.....	.....
Green, Bernard Richardson	.....	.....	.....	.....	94-96

* Resigned.
† Elected President during his term of office as Director.

Name.	President.	Vice-President.	Secretary.	Treasurer.	Director.
Greene, George Sears	76–77	.....	.....	.....	68–69, 71, 73, 75, 77–79
Greene, George Sears, Jr.	.....	85	.....	88–90	82–84, 86
Gzowski, Sir Casimir Stanislaus	.....	.....	.....	.....	94
Haines, Henry Stevens	.....	01–02	.....	.....	97–99
Hamilton, William Gaston	.....	.....	.....	.....	83, 87
Harrod, Benjamin Morgan	97	95–96	.....	.....	92–94
Hering, Rudolph	.....	00–01	.....	.....	91, 97–99
Hermany, Charles	04	91	.....	.....	80
Herschel, Clemens	.....	.....	.....	.....	91
Hill, Albert Banks	.....	.....	.....	.....	92
Holley, Alexander Lyman	.....	77	.....	.....	76
Holman, Minard Lafever	.....	05	.....	.....	.....
Hunt, Charles Warren	.....	.....	95-05	.....	.....
Hutton, William Rich	.....	96–97	.....	.....	84–86
Jackson, William	.....	.....	.....	.....	02–04
Johnson, Lorenzo Medici	.....	.....	.....	.....	97–99
Johnson, Thomas H.	.....	.....	.....	.....	00–02
Just, George Alexander	.....	.....	.....	.....	96–98
Katté, Walter	.....	.....	.....	.....	85, 89
Keefer, Thomas Coltrin	88	86–87	.....	.....	82
Kennedy, John	.....	.....	.....	.....	98–00
Kennedy, William Harlin†	.....	.....	.....	.....	02–03
Kirkwood, James Pugh‡	68	.....	.....	.....	53–67
Knap, Joseph Moss	.....	.....	.....	00–05	94–96
Kuichling, Emil	.....	05	.....	.....	01–03
Landreth, Olin Henry	.....	.....	.....	.....	93–95
Landreth, William Barker	.....	.....	.....	.....	05
Laurie, James	53–67	.....	.....	.....	.....
Leverich, Gabriel	.....	.....	72–77	.....	.....
Lewis, Eugene Castner	.....	.....	.....	.....	03–05
Lewis, Nelson Peter	.....	.....	.....	.....	04–05
Ludlow, William	.....	.....	.....	.....	90
Macdonald, Charles	.....	93–94	.....	.....	71, 74–75
MacLeod, John	.....	92	.....	.....	.....
McAlpine, William Jarvis‡	68–69	.....	.....	.....	54–67, 70
McDonald, Hunter	.....	.....	.....	.....	03–05
McMath, Robert Emmet	.....	.....	.....	.....	89
McNulty, George Washington	.....	.....	.....	.....	92–93
McVean, John Jay	.....	.....	.....	.....	98–00
Manley, Henry	.....	.....	.....	.....	98–00
Martin, Charles Cyril	.....	94–95	.....	.....	.....

†Elected Director Dec. 3d, 1901, to fill the vacancy caused by the death of George A. Quinlan.

‡Mr. Kirkwood resigned the Presidency August 5th, 1868, and Mr. McAlpine was elected for the unexpired term.

Name.	President.	Vice-President.	Secretary.	Treasurer.	Director.
Marx, Charles David	.....	.....	.....	.....	04-05
Mead, Elwood	.....	.....	.....	.....	03-05
Mendell, George Henry	.....	97-98	.....	.....	.....
Merrill, William Emery	.....	.....	.....	.....	83
Metcalf, William	93	.....	.....	.....	83-84
Meyer, Thomas C.*	.....	.....	69	.....	.....
Modjeski, Ralph	.....	.....	.....	.....	04-05
Moore, Robert	02	88, 99-00	.....	.....	92-93
Mordecai, Augustus	.....	.....	.....	.....	95-97
Morell, W. H	.....	.....	.....	.....	53
Morison, George Shattuck	95	.....	.....	.....	.....
Morris, Henry Gurney	.....	.....	.....	.....	86
Morse, James Olis	.....	.....	55-69	55-75	54-67, 77
Morse, Henry Grant	.....	.....	.....	.....	97-99
Myers, Charles Hayward	.....	.....	.....	.....	92
Myers, Edmund Trowbridge Dana	.....	.....	.....	.....	92
Nichols, Othniel Foster	.....	.....	.....	.....	92-93
Noble, Alfred †	03	00-01	.....	.....	95
North, Edward P	.....	98-99	.....	.....	91
O'Rourke, John Francis	.....	.....	.....	.....	00-02
Osborn, Frank Chittenden	.....	.....	.....	.....	01-03
Osgood, Joseph Otis	.....	.....	.....	.....	03-05
Owen, James	.....	.....	.....	.....	97-99
Paine, Charles	83	.....	.....	.....	.....
Paine, William H	.....	82-84	.....	.....	77-81
Parsons, William Barclay	.....	.....	.....	.....	96-98
Pegram, George Herndon	.....	.....	.....	.....	02-04
Peterson, Peter Alexander	.....	96-97	.....	.....	92-93
Pierson, George Spencer	.....	.....	.....	.....	05
Pope, Willard Smith	.....	.....	.....	.....	93-95
Pratt, J. W	.....	.....	.....	.....	54
Prosser, Thomas	.....	.....	.....	.....	70
Prout, Henry Goslee	.....	.....	.....	.....	93-95
Quinlan, George Austin	.....	.....	.....	.....	00-01
Ramsey, Joseph, Jr	.....	.....	.....	.....	00-02
Read, Robert Leland	.....	.....	.....	.....	92-93
Richardson, Henry Brown	.....	.....	.....	.....	00-02
Ricketts, Palmer Chamberlaine	.....	.....	.....	.....	99-01
Roberts, William Milnor	79	74-76, 78	.....	.....	77
Rowland, Thomas Fitch	.....	86-87	.....	.....	71-73
Schneider, Charles Conrad	05	02-03	.....	.....	87, 98-00

* November 3d, 1869, to January 5th, 1870.

† Elected Director Nov. 5th, 1895, to fill the vacancy caused by the death of Willard S. Pope.

PAST AND PRESENT OFFICERS

Name.	President.	Vice-President.	Secretary.	Treasurer.	Director.
Schuyler, James Dix	.....	03-04	.....	.....	92, 99-01
Seaman, Henry Bowman	.....	.....	.....	.....	00-02
See, Horace*	.....	.....	.....	.....	96-98
Sherrerd, Morris Robeson	.....	.....	.....	.....	05
Shinn, William Powell	90	.....	.....	.....	89
Sidell, W. H.	.....	.....	.....	.....	53
Smith, Charles Shaler	.....	.....	.....	.....	78
Smith, Charles Vandervoort	.....	.....	.....	.....	78-81
Smith, T. Guilford	.....	.....	.....	.....	94-96
Sooysmith, Charles	.....	.....	.....	.....	95-97
Stanton, Robert Brewster	.....	.....	.....	.....	94-96
Stearns, Frederic Pike	.....	98-99	.....	.....	93-95
Strobel, Charles Louis‡	.....	.....	.....	.....	86, 94
Swain, George Fillmore	.....	.....	.....	.....	01-03
Symons, Thomas William	.....	.....	.....	.....	96-98
Talcott, William Hubbard	.....	.....	.....	.....	54-68
Thomson, John	.....	.....	.....	95-99	92-94
Towle, Stevenson	.....	.....	.....	.....	87-88
Turner, Edmund Kimball	.....	.....	.....	.....	99-01
Van Buren, Robert	.....	.....	.....	.....	90
Van Hoesen, Edmund French	.....	.....	.....	.....	02-04
Van Horne, John Garret	.....	.....	.....	.....	92
Van Winkle, Edgar Beach	.....	.....	.....	.....	80
Vaughan, Frederic Willis	.....	.....	.....	.....	85
Voorhees, Theodore	.....	.....	.....	.....	90
Wallace, John Findley	00	97-98	.....	.....	.....
Ward, John Frothingham*	.....	.....	.....	.....	68-72
Warren, Gouverneur K.*	.....	.....	.....	.....	80
Webster, George Smedley	.....	.....	.....	.....	04-05
Welch, Ashbel †	82	81	.....	.....	.....
Whinery, Samuel	.....	92-93	.....	.....	91, 99-01
Whitcomb, Henry Donald	.....	.....	.....	.....	94-96
White, William Howard	.....	.....	.....	.....	86
Whitman, Thomas Jefferson	.....	85	.....	.....	.....
Whittemore, Don Juan	84	.....	.....	.....	81
Wilgus, William John	.....	.....	.....	.....	02-04
Wilson, Joseph Miller	.....	94-95	.....	.....	88
Wisner, George Y	.....	.....	.....	.....	98-00
Wood, De Volson*	.....	.....	.....	.....	74
Worthen, William Ezra	87	.....	.....	.....	72

* Resigned.

† Mr. Welch died September 25th, 1882, during his term of office as President.

‡ Elected Director to fill the vacancy caused by the death of Abraham Gottlieb, Feb. 9th, 1894.

DECEASED MEMBERS.

H. M., Honorary Member. M., Member. A. M., Associate Member. F., Fellow.
A., Associate. J., Junior.

Name.	Date of Election.	Date of Death.	Memoirs.*
Abert, John James	H. M. Mar. 2, 1853.	Jan. 27, 1862.	XIX, 88
Abert, Sylvanus Thayer	M. Sept. 21, 1870.	Aug. 11, 1903.	.....
Abbott, Job	M. April 1, 1891.	Aug. 18, 1896.	*XXXVI, 538*
Ackenheil, Charles	M. Feb. 2, 1887.	June 20, 1890.	XVII, 137
Adams, Julius Walker	M. Nov. 5, 1852 H. M. Oct. 26, 1888.	Dec. 13, 1899.	.....
Ainslie, George	F. May 28, 1872.	Sept. 6, 1878.	XV, 41
Ainslie, James W.	F. May 28, 1872.	Sept. 13, 1902.	.....
Ainsworth, Danforth Hurlbut	M. Mar. 3, 1886.	April 24, 1904.	.....
Aldrich, James Colwell	M. May 7, 1873.	April 3, 1900.	*XLV, 617*
Allaire, William Miller	J. Mar. 2, 1881.	Dec. 14, 1884.	XIX, 67
Allen, Horatio	M. Dec. 4, 1867. H. M. Mar. 4, 1874.	Dec. 31, 1889.	XVI, 180
Allen, Theodore	M. Nov. 16, 1870.	Sept. 18, 1890.	XVII, 240
Allen, William Albert	M. May 6, 1891.	Mar. 21, 1896.	*XXXVI, 539*
Allis, Edward Phelps	F. Aug. 4, 1883.	April 1, 1889.	XV, 168
Anderson, Adna	M. Sept. 2, 1874.	May 15, 1889.	XV, 166
Ansley, George Doane	M. Sept. 4, 1878.	Sept. 22, 1883.	XV, 109
Arthur, William Young	M. Dec. 4, 1867. F. Sept. 20, 1870.	Feb. 15, 1876.	.....
Aspinwall, William Howland	F. July 9, 1870.	Jan. 18, 1875.	*XXXVI, 598*
Atwood, William Henry	M. May 4, 1881.	Sept. 4, 1890.	XVII, 205
Avery, John	M. Dec. 4, 1867.	Jan. 30, 1884.	XI, 117
Bache, Alexander Dallas	H. M. Mar. 2, 1853.	Feb. 17, 1867.	*XXXVI, 522*
Bailey, Thomas Norton	M. Nov. 7, 1883.	April 20, 1886.	XVI, 186
Baker, William Latimer	J. Jan. 6, 1875. M. Nov. 6, 1878.	May 28, 1888.	XV, 111
Bannister, Charles Kimball	M. May 3, 1893.	Jan. 10, 1901.	.....
Barbour, William Sullivan	M. April 17, 1872.	Feb. 24, 1889.	XV, 142
Barnard, John Gross	M. Sept. 15, 1869. H. M. April 7, 1873.	May 14, 1882.	XIII, 134
Barnes, David Leonard	M. July 2, 1890.	Dec. 15, 1896.	*XLI, 618*
Barnes, James	M. Mar. 13, 1853.	Feb. 12, 1869.	*XXXVI, 540*
Barr, Jacob Neff	M. Nov. 7, 1888.	May 15, 1904.	.....

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DECEASED MEMBERS B

Name.	Date of Election.	Date of Death.	Memoirs.*
Barriger, John Walker, Jr.	J. May 31, 1898. A. M. April 2, 1902.	Dec. 19, 1902.	.....
Bartlett, Winthrop	M. Jan. 2, 1889.	Jan. 16, 1899.	.....
Batterson, James Goodwin	F. June 7, 1876.	Sept. 18, 1901.	.....
Baumann, Edward	A. June 2, 1880.	Jan. 26, 1889.	XV, 114
Bayley, George William Read	M. July 10, 1872.	Dec. 14, 1876.	IV, 58
Beardsley, Frank Chester	M. Nov. 7, 1894.	July 1, 1895.	XXI, 182
Becker, Max Joseph	M. Aug. 7, 1872.	Aug. 23, 1896.	*XXXVII, 555*
Behrens, William Frederic	J. Nov. 6, 1889. A. M. June 7, 1893.	Feb. 6, 1894.	XX, 87
Belknap, Morris Sheppard	M. Aug. 7, 1872.	July 19, 1890.	XVI, 167
Bell, James E.	M. Mar. 5, 1879.	June 9, 1879.	V, 98
Bentley, Henry Adamson	M. Mar. 2, 1881.	May 13, 1889.	.....
Benyaurd, William H. H.	M. Nov. 3, 1875.	Feb. 7, 1900.	.....
Beresford, Frank .	J. Sept. 7, 1887.	Dec. 12, 1887.	*XXXVI, 594*
Bergengren, Fritz Carl Anders Georg	A. M. Dec. 2, 1896.	Aug. 8, 1904.	.....
Bishop, Thomas Sparks	M. Sept. 2, 1885.	Nov. 13, 1898.	*XLI, 621*
Blake, Edward Josiah	M. April 3, 1889.	May 29, 1902.	.....
Blickensderfer, Jacob	M. June 1, 1881.	Feb. 26, 1899.	.....
Bliss, Henry Isaac	M. Sept. 5, 1883.	July 10, 1896.	*XXXVI, 541*
Blunden, Henry D.	J. Jan. 5, 1876. M. Feb. 4, 1880.	Jan. 7, 1889.	*XXXVI, 542*
Bodfish, Sumner Homer	M. Oct. 2, 1889.	May 17, 1894.	XX, 96
Boeke, August William	M. Sept. 3, 1890.	Oct. 24, 1894.	XX, 204
Bogart, James Peter	J. Jan. 4, 1882. M. July 3, 1895.	Dec. 24, 1903.	*LII, 545*
Bond, Frederick Winn	M. Dec. 7, 1898.	July 12, 1903.	*LI, 452*
Booker, Bernard Frank	J. Oct. 7, 1885. M. June 2, 1891.	July 21, 1894.	XX, 183
Bouscaren, Louis Frederic Gustave	M. April 7, 1875.	Nov. 6, 1904.	.....
Bradbury, Henry Robert	A. July 6, 1881.	July 3, 1901.	.....
Bridgford, John	F. Jan. 14, 1871.	Mar. 8, 1898.	.....
Briggs, Albert Dwight	F. May 17, 1870.	Feb. 20, 1881.	XV, 132
Briggs, Robert	M. Oct. 19, 1870.	July 24, 1882.	*XXXVI, 542*
Brough, Redmond John	M. Sept. 1, 1880.	July 21, 1883.	XII, 40
Brown, Charles Irwin	M. Jan. 7, 1891.	Mar. 23, 1899.	.....
Brown, John Milton	M. April 1, 1874.	June 16, 1874.	I, 170
Bruner, Daniel Pastorius	J. Sept. 6, 1876. M. May 7, 1879.	Aug. 29, 1901.	.....
Brush, Charles Benjamin	A. Sept. 6, 1871. M. Sept. 5, 1877.	June 3, 1897.	.....
Buckhout, Isaac Craig	M. July 15, 1872.	Sept. 27, 1874.	I, 171
Burden, Henry	H. M. Mar. 2, 1853.	Jan. 19, 1871.	.....
Burr, James Dewey	M. April 5, 1876.	May 5, 1886.	XII, 107

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Name.	Date of Election.	Date of Death.	Memoirs.*
Burton, Standish Barry	M. June 1, 1898.	Aug. 13, 1904.	.....
Butts, Elijah Polhill	J. Nov. 3, 1886.	Jan. 11, 1892.	XVIII, 129
Camp, Jonathan, Jr.	M. Dec. 31, 1873.	April 16, 1874.	I, 186
Campbell, Allan	M. Feb. 19, 1868. H. M. Mar. 1, 1892.	Mar. 18, 1894.	XX, 179
Campbell, Charles Edward Henry	M. Oct. 3, 1883.	Dec. 6, 1902.	*LII, 547*
Card, Joseph P.	A. Sept. 5, 1883.	Oct. 22, 1894.	XXI, 68
Card, William Warren	M. Sept. 5, 1883.	April 4, 1903.	.....
Carpenter, Clarence Allan	M. May 2, 1888.	Nov. 9, 1899.	.....
Carrel, Frederick Janvrin	M. Mar. 5, 1884.	May 2, 1894.	*XXXVII, 559*
Cartwright, Henry	M. Sept. 6, 1876.	June 30, 1881.	VII, 124
Cary, Edgar Sheldon	M. Nov. 1, 1882.	Jan. 5, 1883.	*XLVI, 555*
Cass, George Washington, Jr.	F. Mar. 30, 1871.	Mar. 21, 1888.	*XXXVI, 599*
Chase, Samuel Stewart	M. Dec. 8, 1868. F. Mar. 12, 1870.	May 29, 1873.	I, 40
Cheney, Nathaniel	F. June 21, 1870.	June 29, 1901.	.....
Chesbrough, Ellis Sylvester	M. June 17, 1868.	Aug. 18, 1886.	XV, 160
Cisneros, Francisco Javier	M. May 15, 1872.	July 7, 1898.	*XLI, 622*
Clapp, Lorenzo Russell	M. Feb. 1, 1888.	Aug. 13, 1902.	*XLIX, 341*
Clark, Ira Edgar	J. Feb. 6, 1878.	May 23, 1882.	VIII, 92
Clark, Jacob Merrill	M. Jan. 29, 1868.	Dec. 21, 1894.	XX, 203
Clarke, Henry Wadsworth	M. Mar. 15, 1871.	Feb. 23, 1892.	XVIII, 93
Clarke, Thomas Curtis	M. Mar. 18, 1868. F. May 20, 1872.	June 15, 1901.	*L, 495*
Cleemann, Thomas Mutter	M. Oct. 1, 1879.	Nov. 16, 1893.	XX, 69
Clemens, Ernest Victor	M. Mar. 1, 1893.	Sept. 3, 1893.	XX, 161
Clement, Victor M.	F. Jan. 8, 1890.	April 28, 1903.	.....
Cleverdon, Henry Lawrence	A. M. Mar. 1, 1899.	Aug. 27, 1902.	*L, 507*
Cobb, Robert Linah	M. Jan. 2, 1890.	June 2, 1895.	*XXXVI, 545*
Cochran, A. P.	F. June 19, 1872.	April 26, 1886.	.....
Colburn, Warren	M. Mar. 18, 1868.	Sept. 15, 1879.	VI, 4
Colburn, Zerah	M. Jan. 5, 1855.	April 26, 1870.	*XXXVI, 546*
Colby, Charles Lewis	F. July 31, 1883.	Feb. 26, 1896.	.....
Colman, Isaac D.	M. Feb. 27, 1869.	April 7, 1875.	I, 331
Connor, Addison	M. Jan. 5, 1887.	Jan. 4, 1891.	*XXXVI, 551*
Conro, Albert	F. June 13, 1883.	Jan. 10, 1901.	.....
Constable, Casimir	M. June 17, 1868.	Feb. 6, 1905.	.....
Cooke, Robert Latimer	M. April 17, 1872.	Aug. 11, 1877.	IV, 66
Coppée, Henry St. Leger	M. Oct. 5, 1887.	May 8, 1901.	.....
Correa, Edward Arnold	M. Mar. 7, 1900.	June 24, 1900.	*XLV, 621*
Coryell, Martin	M. Dec. 4, 1867.	Nov. 30, 1886.	XV, 133
Courtwright, Milton	F. June 11, 1870.	April 25, 1883.	.....
Coxe, Eckley Brinton	M. Feb. 7, 1877.	May 13, 1895.	*XXXVI, 552*
Crabb, Thomas	J. April 4, 1899.	Dec. 21, 1901.	.....
Craven, Alfred Wingate	M. Nov. 5, 1852.	Mar. 27, 1879.	VI, 24

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Name.	Date of Election.	Date of Death.	Memoirs.*
Craven, Henry Smith	M. Dec. 3, 1884.	Dec. 7, 1889.	XVI, 217
Crosby, Wilson	M. Sept. 15, 1869.	Dec. 18, 1904.	.....
Cunningham, John Miller	A. M. Oct. 7, 1903.	Aug. 8, 1904.	.....
Cunningham, Paul Davis	A. M. Mar. 1, 1899.	July 13, 1901.	*LII, 556*
Curtis, Wendell Rhodes	J. Mar. 3, 1875. / M. June 4, 1884.	Mar. 7, 1893.	XX, 86
Curtis, William Giddings	M. May 3, 1882.	June 15, 1900.	*XLV, 624*
Cushing, Oliver E.	M. July 10, 1872.	Jan. 17, 1890.	XVI, 166
Cushing, Robert Delano	A. M. Sept. 6, 1899.	Aug. 23, 1903.	.....
Cushing, Samuel Barrett	M. Sept. 2, 1869.	July 17, 1873.	I, 43
Cushing, Samuel Barrett	M. June 1, 1887.	Dec. 2, 1888.	*XLIX, 343*
Dagron, James Gustavus	M. Oct. 6, 1886.	May 25, 1895.	.....
Davidson, Matthias Oliver	M. April 6, 1853.	Sept. 1, 1872.	XIX, 56
Davis, Frank Paul	M. Feb. 1, 1888.	May 3, 1900.	.....
Davis, John Woodbridge	A. June 3, 1885.	Nov. 7, 1902.	*XLIX, 370*
Dearborn, William Lee	M. Jan. 29, 1868.	Mar. 15, 1875.	I, 330
DeCourcy, Bolton Waller	M. Nov. 6, 1889.	April 1, 1900.	.....
DeForest, George Thompson	A. M. Dec. 4, 1895.	July 25, 1901.	.....
DeGaray, Francisco	F. Aug. 31, 1883.	Sept. 2, 1896.	.....
Del Monte, Emilio	M. Dec. 4, 1895.	Mar. 20, 1902.	.....
Derbishire, James Stewart	M. April 2, 1884.	Jan. 2, 1887.	XIII, 66
Dexter, George M.	M. Dec. 3, 1852.	Nov. 26, 1872.	I, 40
Dickinson, George Codwise	M. Feb. 5, 1890.	Jan. 24, 1892.	XVIII, 71
Dickinson, Pomeroy P.	M. Jan. 17, 1872.	Oct. 4, 1895.	*XLIII, 611*
Dillon, Sidney	F. Mar. 26, 1870.	June 9, 1892.	*XXXVI, 603*
Dirks, Justus	H. M. June 2, 1880.	Dec. 26, 1886.	XIII, 45
Diven, Alexander Samuel	F. June 16, 1870.	June 11, 1896.	*XXXVII, 571*
Doane, Thomas	M. June 7, 1882.	Oct. 22, 1897.	*XXXIX, 690*
Doran, Frank C.	M. Sept. 5, 1883.	Oct. 15, 1898.	.....
Dorsey, Edward Bates	M. June 4, 1879.	†	.....
Downes, Stancliff Bazen	J. April 7, 1886.	April 21, 1895.	XXI, 105
Dresser, George Warren	M. July 5, 1876.	May 27, 1883.	XIX, 110
Duane, James	M. Mar. 2, 1892.	Jan. 12, 1899.	.....
Duane, James Chatham	H. M. Nov. 20, 1886.	Nov. 8, 1897.	*XXXIX, 686*
Du Barry, Joseph Napoleon	M. Jan. 6, 1875.	Dec. 17, 1892.	XIX, 108
Dunham, Charles Frederick	M. April 2, 1902.	June 13, 1903.	.....
Durant, Thomas C.	F. Nov. 18, 1870.	Oct. 5, 1885.	*XXXVI, 602*
Eads, James Buchanan	M. Dec. 16, 1868. / F. Mar. 30, 1870.	Mar. 8, 1887.	XIII, 46
Eaton, Horace LaFayette	M. Feb. 1, 1893.	Nov. 23, 1895.	*XXXVI, 554*
Eayrs, Norman Wilder	M. June 3, 1885.	May 13, 1900.	.....
Edge, George Washington	M. Mar. 4, 1874.	Jan. 1, 1880.	VI, 18
Elliott, George Harford	M. April 4, 1883.	Oct. 7, 1886.	XV, 110

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† Date of death unknown.

Name.	Date of Election.	Date of Death.	Memoirs.*
Ellis, Nathaniel Webster	M. Feb. 2, 1881.	Jan. 16, 1889.	XV, 112
Ellis, Theodore Grenville	M. Feb. 17, 1869. / F. Nov. 21, 1872.	Jan. 9, 1883.	*XXXVII, 557*
Ellsworth, Alfred Burnham	J. May 1, 1889.	Jan. 10, 1893.	XIX, 48
Ely, George Hervey	A. May 31, 1892.	Jan. 24, 1894.	.....
Emack, Charles S.	M. July 6, 1870.	July 26, 1877.	IV, 65
Emerson, George Dana	M. Sept. 18, 1872.	Sept. 26, 1900.	.....
Emery, Charles Edward	M. May 6, 1874.	June 1, 1898.	*XLII, 558*
Emmet, Thomas Addis	M. Nov. 5, 1852.	Jan. 12, 1880.	VI, 2
Emonts, William Alexis George	J. Sept. 6, 1876.	Nov. 5, 1887.	*XXXVI, 594*
Ensign, Elisha Williams	F. May 18, 1870.	Oct. 1, 1877.	.....
Ericsson, John	H. M. Oct. 2, 1879.	Mar. 8, 1889.	.....
Evans, Anthony Walton White	M. Dec. 4, 1867. / F. Mar. 15, 1870.	Nov. 28, 1886.	XIII, 30
Evans, Louis Provost	M. Sept. 3, 1884.	Aug. 19, 1896.	.....
Falconnet, Eugene F.	M. June 3, 1874.	Oct. 14, 1887.	XV, 135
Fargo, William G.	F. May 6, 1870.	Aug. 4, 1881.	.....
Farnam, Henry	F. Nov. 14, 1872.	Oct. 4, 1883.	*XXXVI, 605*
Farquhar, Francis Ulric	M. July 10, 1872.	July 3, 1883.	XV, 165
Fava, Francis Renatus, Jr.	M. Nov. 5, 1890.	Mar. 27, 1896.	.....
Feind, Anthony Erneste Bernhard	M. Jan. 2, 1890.	Aug. 21, 1894.	XX, 182
Felton, Samuel Morse	F. Mar. 23, 1870.	Jan. 24, 1889.	XIX, 92
Field, Burr Kellogg	M. Oct. 1, 1884.	Jan. 13, 1898.	*XL, 568*
Fink, Albert	M. July 20, 1870. / F. Sept. 3, 1872.	April 3, 1897.	*XLI, 626*
Fisher, Charles Henry	M. June 7, 1869.	Jan. 18, 1888.	XIX, 66
Fisher, Clark	M. Oct. 19, 1870.	Dec. 31, 1903.	.....
Flad, Henry	M. Feb. 15, 1871.	June 20, 1898.	*XLII. 561*
Flint, Edward Austin	M. May 18, 1870.	Jan. 23, 1886.	XII, 114
Flynn, Benjamin Harrison	J. Oct. 2, 1900.	Mar. 1, 1903.	.....
Flynn, Patrick John	M. Feb. 4, 1891.	June 1, 1893.	XX, 68
Fogg, Charles E.	M. Oct. 16, 1872.	April 26, 1891.	XVII, 230
Ford, Arthur Livermore	A. Nov. 6, 1872.	May 30, 1880.	VI, 75
Forshey, Caleb Goldsmith	M. Aug. 7, 1872.	July 25, 1881.	*XXXVII, 560*
Fowler, Charles Edward	M. May 3, 1876.	Jan. 28, 1883.	XV, 164
Francis, James	M. Jan. 4, 1893.	Dec. 1, 1898.	*XLV, 627*
Francis, James Bicheno	M. Nov. 5, 1852. / F. May 4, 1870. / H. M. April 5, 1892.	Sept. 18, 1892.	XIX, 74
Frank, George William	M. Feb. 1, 1899.	Jan. 19, 1905.	.....
Franklin, William Buel	M. April 1, 1874.	Mar. 8, 1903.	.....
Freeman, Ernest Grey	A. M. May 3, 1893. / M. Oct. 5, 1898.	Mar. 6, 1900.	.....
French, Edmund	M. Nov. 26, 1852.	July 7, 1860.	*XXXVII, 561*

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DECEASED MEMBERS F–H

Name.	Date of Election.	Date of Death.	Memoirs.*
French, Frederick Reginald	M. Sept. 7, 1904.	Nov. 20, 1904.	.....
Frost, Benjamin Dix	M. Feb. 21, 1872.	July 19, 1880.	XIII, 139
Fteley, Alphonse	M. Jan. 5, 1876.	June 11, 1903.	.....
Fuertes, Estevan Antonio	M. Feb. 17, 1869.	Jan. 16, 1903.	.....
Gardiner, Edward	M. Nov. 5, 1852.	†	.....
Gardner, George Clinton	M. Nov. 3, 1875.	Aug. 12, 1904.	.....
Gardner, Henry A.	M. Dec. 13, 1852.	July 26, 1875.	I, 335
Garfias, Ignacio	M. Oct. 5, 1892.	Jan. 16, 1898.	.....
Gelette, William Durfree	M. April 1, 1885.	April 27, 1902.	*L, 500*
Giblin, Arthur Leon	J. Jan. 31, 1893.	July 17, 1894.	XX, 171
Gillespie, Joshua Lathrop	J. Feb. 3, 1875. M. April 2, 1884.	Aug. 22, 1890.	XVI, 224
Gillham, Robert	M. June 2, 1886.	May 19, 1899.	*XLIII, 613*
Gilliss, John Roberts	M. June 2, 1869. F. Mar. 15, 1870.	July 15, 1870.	*XXXVI, 555*
Gillmore, Quincy Adams	M. Dec. 2, 1868.	April 7, 1888.	XX, 60
Gilman, Charles Carroll	F. May 11, 1871.	July 31, 1899.	.....
Golay, Philip	M. Sept. 5, 1877.	Oct. 31, 1898.	.....
Goodwin, Homer Stanley	M. July 20, 1870.	Oct. 25, 1892.	XIX, 163
Goodwin, John Marston	M. Sept. 4, 1872.	Oct. 21, 1891.	XVII, 267
Gorringe, Henry H.	A. April 6, 1881.	July 6, 1885.	XVI, 215
Gottlieb, Abraham	M. Sept. 4, 1872.	Feb. 9, 1894.	XX, 76
Gould, Edward Sherman	M. Nov. 4, 1885.	Jan. 24, 1905.	.....
Graff, Frederic	M. May 7, 1873.	Mar. 30, 1890.	XVII, 247
Grant, William Harrison	M. July 2, 1873.	Oct. 12, 1896.	*XXXVI, 557*
Grain, William	M. Sept. 15, 1869.	Jan. 10, 1877.	.....
Grassau, H.	M. July 6, 1853.	May 16, 1870.	.....
Greene, Benjamin H.	M. May 1, 1878.	Jan. 4, 1890.	XVI, 187
Greene, Charles Ezra	M. Jan. 4, 1882.	Oct. 17, 1903.	.....
Greene, Edward Appleton	M. July 4, 1888.	April 19, 1903.	.....
Greene, George Sears	M. Nov. 5, 1852. H. M. Oct. 26, 1888.	Jan. 28, 1899.	*XLIX, 335*
Greene, Joseph Norton	M. Oct. 5, 1887.	July 26, 1904.	.....
Greenwood, William Henry	M. Mar. 3, 1880.	Aug. 29, 1880.	VII, 89
Gridley, Vernon Hill	J. Feb. 4, 1896.	Sept. 17, 1896.	*XXXVI, 595*
Griffen, John	M. April 15, 1868.	Jan. 14, 1884.	XII, 38
Gurnee, Walter S.	F. May 10, 1870.	April 17, 1903.	.....
Gzowski, *Sir* Casimir Stanislaus	M. Dec. 2, 1868.	Aug. 24, 1898.	*XLII, 567*
Haddock, Arba Read	A. May 4, 1881.	Feb. 28, 1885.	XIX, 67
Hall, George Thomas	A. Oct. 2, 1872. M. Sept. 2, 1874.	June 2, 1881.	VII, 97
Hamlin, Charles Edward	A. Jan. 2, 1894.	Jan. 20, 1902.	.....

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† Date of death unknown.

Name.	Date of Election.	Date of Death.	Memoirs.*
Hannaford, Edmund Phillips	M. Sept. 18, 1872.	Aug. 19, 1902.	.. ..
Harbaugh, Springer	F. May 19, 1871.	Dec. 8, 1887.	XV, 46
Hardee, Thomas Sydenham	M. April 4, 1877.	May 20, 1880.	XII, 66
Harding, Horace	M. Nov. 2, 1892.	July 29, 1899.	*XLIII, 618*
Hardy, George Richardson	M. Nov. 7, 1888.	April 2, 1903.	.....
Harris, Henrique	M. Dec. 3, 1873.	Oct. 10, 1882.	*XXXVII, 562*
Harris, Robert Lewis	M. May 3, 1876.	Sept. 29, 1896.	.....
Harrison, Stephen A.	F. Jan. 30, 1873.	June 6, 1898.	.....
Harrod, Thomas	J. Dec. 3, 1891.	Dec. 31, 1896.	.....
Hasell, Bentley Douglas	M. July 3, 1878.	May 29, 1900.	.....
Haskell, Charles Frederic Beals	M. Oct. 7, 1891.	May 20, 1895.	XXI, 181
Haslett, Sullivan	M. June 4, 1879.	Jan. 4, 1887.	XIII, 127
Hatfield, Robert G.	M. Dec. 4, 1867.	Feb. 15, 1879.	*XXXVI, 558*
Hawkshaw, *Sir* John	H. M. Nov. 3, 1880.	June 2, 1891.	XVII, 250
Hayward, James A.	M. Sept. 5, 1877.	Aug. 13, 1880.	VII, 88
Hegeman, Allen Bogardus	M. Feb. 1, 1888.	Oct. 22, 1892.	XIX, 171
Hildreth, Russell Wadsworth	J. Jan. 4, 1888.	Dec. 23, 1895.	*XXXVI, 596*
Hilgard, Julius Erasmus	M. July 10, 1872.	May 8, 1891.	XVIII, 189
Hillman, Charles La Fletcher	M. July 5, 1876.	June 14, 1902.	*XLIX, 345*
Hislop, John	M. May 1, 1895.	Feb. 22, 1901.	.....
Hjortsberg, Maximilian	M. July 10, 1872.	May 16, 1880.	VIII, 118
Hobby, Arthur Stanley	M. June 6, 1894.	May 28, 1902.	*XLIX, 347*
Hoe, Richard March	M. Oct. 1, 1873.	June 8, 1886.	XVI, 170
Holley, Alexander Lyman	M. Oct. 1, 1873.	Jan. 29, 1882.	XVI, 212
Houston, John	M. May 6, 1868.	Aug. 30, 1896.	*XXXIX, 694*
Howe, Milton Grosvenor	M. Oct. 16, 1872.	June 19, 1902.	*XLIX, 349*
Howell, Charles W.	M. Mar. 3, 1875.	April 5, 1882.	VIII, 121
Howell, George Washington	M. May 2, 1888.	Feb. 15, 1901.	*XLIX, 351*
Howland, George, Jr.	F. June 6, 1870.	Feb. 18, 1892.	XX, 154
Humphrey, William Sheldon	A. M. Sept. 2, 1891.	April 18, 1895.	XXI, 98
Humphreys, Andrew Atkinson	H. M. May 7, 1873.	Dec. 27, 1883.	XVI, 218
Hunt, Alfred Ephraim	M. Sept. 1, 1886.	April 26, 1899.	*XLVI, 557*
Hunt, Randell	M. May 2, 1883.	Jan. 24, 1898.	*XLV, 629*
Huntington, Collis Potter	F. Mar. 10, 1877.	Aug. 13, 1900.	.....
Hutton, William Rich	M. Jan. 8, 1873.	Dec. 11, 1901.	.....
Hyde, William B.	M. July 12, 1877.	June 8, 1882.	XVI, 172
Ives, Edward Bernard	M. April 5, 1893.	Dec. 30, 1903.	.....
James, John Collinson	M. Mar. 1, 1876.	Feb. 27, 1883.	XVI, 164
Jennings, Henry Clay	M. April 6, 1887.	Mar. 13, 1894.	XX, 88
Jervis, John Bloomfield	M. Dec. 4, 1867. H. M. Dec. 2, 1868. F. Mar. 19, 1880.	Jan. 12, 1885.	XI, 109

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DECEASED MEMBERS J–L

Name.	Date of Election.	Date of Death.	Memoirs.*
Jewett, William Bradford	J. June 4, 1891.	Nov. 7, 1894.	XX, 202
Johnson, Archibald	M. April 6, 1898.	Oct. 3, 1899.	.....
Johnson, Charles Roberts	M. June 3, 1885.	Sept. 11, 1893.	XX, 45
Johnson, John Butler	M. April 7, 1886.	June 23, 1902.	*LI, 454*
Johnson, Lorenzo Medici	J. Mar. 3, 1875. / M. April 7, 1880.	Nov. 28, 1904.	.....
Johnson, T. Marr	M. Feb. 26, 1872.	July 31, 1874.	I, 171
Johnston, Andrew Langstaff	M. June 4, 1890.	May 15, 1901.	.....
Jones, Benjamin Franklin	F. June 13, 1870.	May 19, 1903.	.....
Jordan, Gabriel	M. Sept. 18, 1872.	Nov. 10, 1884.	XVI, 184
Joy, James Frederic	F. Nov. 6, 1872.	Sept. 24, 1896.	*XXXVII, 575*
Judah, Theodore Dehone	M. May 4, 1853.	Nov. 2, 1863.	*XXXVIII, 448*
Keefer, Samuel	M. Jan. 6, 1869.	Jan. 9, 1890.	XVI, 220
Killebrew, Samuel	M. Sept. 2, 1885.	Jan. 9, 1899.	*XLI, 639*
Kingsley, William C.	F. June 6, 1870.	Feb. 21, 1885.	*XXXVI, 612*
Kirkwood, James Pugh	M. Nov. 5, 1852.	April 22, 1877.	IV, 60
Kloman, Andrew	F. Jan. 27, 1875.	Dec. 19, 1880.	VII, 122
Knight, William Baker	J. Jan. 6, 1875. / M. Jan. 7, 1880.	Dec. 7, 1890.	XVII, 277
Knowlton, Charles Andrews	M. Oct. 2, 1901.	Mar. 2, 1903.	.....
Krupp, Alfred	F. June 14, 1870.	July 14, 1887.	*XXXVI, 609*
Lane, Moses	M. Dec. 4, 1867.	Jan. 25, 1882.	XIX, 58, 101
Lassig, Moritz	M. April 2, 1884.	Jan. 7, 1902.	*XLIX, 353*
Latcha, Jacob Albert	M. May 7, 1873.	Nov. 30, 1904.	.....
Latham, Norman Smith	J. July 3, 1889.	Nov. 10, 1903.	.....
Latimer, Charles	M. April 5, 1876.	Mar. 25, 1888.	XV, 137
Latrobe, Charles Hazlehurst	M. Nov. 16, 1870.	Sept. 19, 1902.	.....
Laurie, James	M. Nov. 5, 1852.	Mar. 16, 1875.	*XXXVII, 553*
Lawler, John	F. April 28, 1883.	Feb. 23, 1891.	.....
Lawson, William Bateman	M. Feb. 1, 1893.	Jan. 27, 1901.	*XLVI, 560*
Lawton, Frederick Beecher	J. Nov. 5, 1891. / A. M. Nov. 4, 1896.	Oct. 13, 1897.	.....
Leers, Frank Adolph	M. May 4, 1887.	May 19, 1890.	XX, 85
Lesage, Louis	M. Sept. 7, 1881.	Jan. 9, 1889.	XVI, 96
Leutzé, Trevor McClurg	M. Feb. 3, 1897.	Oct. 14, 1901.	.....
Lewis, Isaiah William Penn	M. Jan. 5, 1853.	Oct. 18, 1856.	*XXXVIII, 453*
Lewis, James Frederick	A. Feb. 6, 1889.	July 23, 1901.	.....
Libby, Edmund Dorman	M. May 6, 1885.	April 24, 1903.	.....
Lincoln, William Shattuck	M. Dec. 5, 1883.	May 16, 1902.	*LI, 457*
Lindenberger, Cassius Howard	A. Feb. 2, 1892.	Jan. 5, 1905.	.....
Lindenthal, Dominik	A. M. Mar. 4, 1896.	June 7, 1900.	*XLV, 637*
Locke, Augustus Woodbury	M. June 7, 1882.	May 14, 1893.	XIX, 172
Lockwood, John	A. April 5, 1882.	Dec. 9, 1891.	XVIII, 192

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Long, Dennis	F. Mar. 28, 1872.	Oct. 8, 1893.	.....
Looker, Henry Brigham	A. M. May 3, 1893.	Jan. 3, 1905.	.....
Lotz, William Herman	M. Sept. 1, 1875.	Jan. 31, 1894.	XX, 74
Lovecraft, Frederick Aaron	F. Nov. 1, 1892.	Oct. 26, 1893.	.....
Lovett, Thomas Davis	M. May 3, 1871.	Dec. 5, 1897.	*XL, 571*
Lowe, Gorham Parsons	M. April 21, 1869.	Jan. 8, 1894.	XX, 72
Lowthorp, Francis C.	M. April 1, 1868. F. Mar. 17, 1870.	June 1, 1890.	XX, 196
Ludlow, William	M. July 5, 1882.	Aug. 30, 1901.	.....
Lyon, William M.	F. Mar. 23, 1870.	July 3, 1889.	XVI, 112
Lyte, Francis Asbury	A. M. Oct. 5, 1892.	June 24, 1896.	*XXXVIII, 461*
MacLeod, John	M. July 10, 1872.	Jan. 21, 1900.	.....
Macy, Arthur	J. July 12, 1877. M. Dec. 2, 1885.	April 14, 1891.	*XXXVII, 562*
McAlpine, Charles LeGrand	M. Dec. 4, 1867.	Jan. 11, 1884.	*XXXVII, 563*
McAlpine, William Jarvis	M. Feb. 3, 1853. H. M. Oct. 26, 1888.	Feb. 16, 1890.	XVIII, 115
McCalla, Richard Calvin	J. July 2, 1890. A. M. Sept. 2, 1891. M. Dec. 5, 1894.	June 13, 1904.	.....
McGee, Van Norman	A. M. June 6, 1900.	Sept. 28, 1904.	.....
McKean, Reginald	A. M. May 2, 1894.	Oct. 15, 1901.	*XLIX, 366*
McKeown, Thomas	M. Dec. 3, 1879.	June 7, 1904.	..... .
McNair, Thomas Speer	M. July 2, 1873.	July 25, 1901.	.....
Mahan, Dennis Hart	H. M. Mar. 2, 1853.	Sept. 16, 1871.	XIX, 161
Malézieux, Emile	H. M. Nov. 3, 1880.	May 20, 1885.	*XXXVI, 524*
Mann, George Edward	M. Sept. 3, 1884.	Oct. 2, 1897.	.....
Marindin, Henry Louis	M. May 7, 1884.	Mar. 25, 1904.	.. ..
Marshall, Charles Alfred	M. Oct. 1, 1884.	May 31, 1889.	XVI, 99
Marsland, Edward	M. Feb. 6, 1878.	June 25, 1898.	.....
Martin, Charles Cyril	M. July 10, 1872.	July 11, 1903.	. .....
Martin, Robert Kirkwood	M. June 1, 1892.	Nov. 24, 1893.	XX, 43
Mason, Eddy D.	M. July 19, 1872 F. Dec. 28, 1872.	Dec. 19, 1874.	I, 329
Mendell, George Henry	M. Sept. 6, 1876.	Oct. 19, 1902.	*LI, 459*
Mercur, Frederick	M. July 20, 1870.	Jan. 17, 1888.	XVII, 157
Meriwether, Niles	M. Nov. 1, 1871.	Dec. 28, 1900.	*XLV, 632*
Merrill, William Emery	M. Oct. 6, 1872.	Dec. 14, 1891.	XVIII, 90
Merz, Frederick W.	F. May 28, 1872.	Dec. 8, 1883.	*XXXVI, 615*
Michaelis, Otho Ernest	M. May 6, 1874.	May 1, 1890.	XVII, 132
Michie, William Roberts	J. Feb. 28, 1893. A. M. Oct. 7, 1896.	Feb. 2, 1899.	*XLI, 647*
Miller, Alexander Macomb	M. June 6, 1888.	Sept. 14, 1904.	.....
Miller, Samuel H.	M. Sept. 6, 1882.	Mar. 18, 1891.	XVII, 208

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Name.	Date of Election.	Date of Death.	Memoirs.*
Miller, Silvanus, Jr.	M. Mar. 2, 1887.	Dec. 17, 1897.	*XXXIX, 696*
Mills, James Ellison	M. Feb. 3, 1886.	July 25, 1901.	.....
Milne, Peter	A. Jan. 7, 1896.	June 9, 1902.	.....
Minturn, Rowland Robinson	M. Nov. 2, 1887.	April 7, 1898.	.....
Mitchell, Alexander	F. June 13, 1883.	April 19, 1887.	XIII, 98
Mitchell, Henry	M. Jan. 7, 1880.	Dec. 1, 1902.	.....
Moffet, James David	{ A. M. Nov. 4, 1891. M. Feb. 7, 1894. }	Nov. 3, 1899.	.....
Monroe, John Albert	M. Sept. 4, 1869.	June 11, 1891.	XIX, 148
Morison, George Shattuck	M. Jan. 6, 1875.	July 1, 1903.	.....
Morley, James Henry	M. Oct. 6, 1886.	Sept. 8, 1889.	XVI, 110
Morley, William Raymond	M. Sept. 6, 1882.	Jan. 3, 1883.	IX, 121
Morrell, William H.	M. Nov. 5, 1852.	†	.....
Morris, Gouverneur	M. Oct. 3, 1888.	Dec. 30, 1897.	*XXXIX, 698*
Morris, Robert Campbell	M. Jan. 7, 1874.	Nov. 8, 1892.	XVIII, 220
Morris, William W.	M. Jan. 5, 1853.	†	.....
Morse, Henry Grant	M. April 7, 1880.	June 2, 1903.	.....
Morse, James Otis	M. Feb. 9, 1853.	Mar. 8, 1883.	XIX, 47
Morton, John Henry	M. June 3, 1891.	Feb. 8, 1892.	XVIII, 105
Murdoch, Gilbert	M. Sept. 7, 1881.	May 28, 1894.	XX, 152
Myers-Beswick, William Beswick	M. Jan. 3, 1894.	Dec. 27, 1904.	.....
Neilson, Robert	M. Feb. 17, 1869.	Oct. 12, 1896.	*XXXVII, 564*
Newell, John	M. Jan. 29, 1868.	Aug. 26, 1894.	XX, 172
Newham, Charles Edward	M. Dec. 7, 1887.	Feb. 1, 1898.	.....
Newton, Isaac	M. Mar. 3, 1880.	Sept. 25, 1884.	XI, 128
Newton, John	H. M. April 30, 1884.	May 1, 1895.	.....
Nichols, Norman James	M. Dec. 5, 1888.	April 8, 1896.	*XXXVI, 559*
Nickerson, Louis H.	M. Sept. 18, 1872.	May 6, 1877.	.....
Norman, George H.	{ M. Feb. 17, 1869. F. Mar. 23, 1870. }	Feb. 4, 1900.	.....
Norton, Frederick Oakford	F. June 4, 1879.	Sept. 27, 1892.	XVIII, 219
Nourse, Edwin Green	M. Sept. 3, 1884.	Dec. 8, 1897.	*XXXIX, 699*
Noyes, Albert Franklin	M. Dec. 3, 1884.	Oct. 12, 1896.	*XXXVI, 560*
Ogden, William B.	F. Mar. 23, 1870.	Aug. 3, 1877.	IV, 67
Olney, Robert Blum	{ J. Jan. 3, 1895. A M. Sept. 5, 1900. }	Mar. 4, 1903.	*L, 510*
O'Melveny, John Charles	M. May 4, 1898.	Oct. 3, 1899.	.....
O'Sullivan, Thomas S.	M. Jan. 5, 1853.	Nov. 1, 1855.	.....
Paddock, Joseph Hill	M. Oct. 5, 1892.	April 4, 1894.	XX, 89
Paine, William H.	M. May 12, 1875.	Dec. 31, 1890.	XVII, 160
Palmer, Cornelius	M. Nov. 2, 1887.	July 31, 1903.	.....
Parker, Charles Francis	J. Mar. 5, 1890.	Oct. 10, 1898.	.....

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† Date of death unknown.

Name.	Date of Election.	Date of Death.	Memoirs.*
Patterson, John Austin	M. May 2, 1900.	May 3, 1903.	.....
Pennypacker, Levis Passmore	A. M. April 1, 1891.	Jan. 30, 1901.	*XLVI, 570*
Petry, Alfred	M. Oct. 6, 1886.	May 14, 1901.	.....
Philbrick, Edward Southwick	M. May 6, 1874.	Feb. 13, 1889.	*XXXVIII, 454*
Phillips, William	F. Mar. 23, 1870.	April 14, 1874.	I, 169
Phinney, Henry Ward Beecher	M. Jan. 7, 1885.	Nov. 22, 1888.	*XXXVI, 563*
Pike, William Abbot	M. Dec. 3, 1890.	Oct. 13, 1895.	XXI, 212
Platt, Joseph Curtis	M. July 2, 1895.	July 7, 1898.	.....
Poe, Orlando M.	M. Jan. 8, 1873.	Oct. 2, 1895.	.....
Poinier, P. Porter	J. Mar. 3, 1875.	June 11, 1876.	IV, 74
Pope, Macy Stanton	A. M. May 2, 1900.	Dec. 10, 1904.	.....
Pope, Willard Smith	M. Aug. 7, 1872.	Oct. 10, 1895.	*XXXVI, 565*
Porter, Albert Howell	J. July 4, 1888. / A. M. July 1, 1891.	Aug. 9, 1899.	.....
Post, Andrew Jackson	M. Nov. 1, 1871.	Mar. 12, 1896.	.....
Post, James Clarence	M. Feb. 6, 1878.	Jan. 6, 1896.	*XXXVI, 569*
Post, Simeon S.	M. Nov. 5, 1852.	June 29, 1872.	XIX, 49
Potts, Joseph Dilwyn	M. Aug. 5, 1868.	Dec. 3, 1893.	XX, 49
Potts, Richard	M. June 1, 1870.	July 11, 1891.	XVII, 242
Pratt, Thomas Willis	M. Nov. 2, 1853. / F. Nov. 4, 1870.	July 17, 1875.	I, 332
Pratt, William Arthur	M. Dec. 4, 1895.	Sept. 19, 1904.	.....
Prendergast, Francis Ensor	M. Mar. 7, 1888.	Dec. 7, 1897.	*XXXIX, 701*
Price, Philip M.	M. May 2, 1888.	Oct. 4, 1894.	XX, 200
Prosser, Thomas	M. Dec. 4, 1867.	Sept. 15, 1870.	*XXXVI, 564*
Prosser, Thomas	F. June 1, 1870.	Jan. 6, 1896.	.....
Putnam, Joseph W.	A. Mar. 3, 1880.	Mar. 24, 1893.	XX, 87
Quinlan, George Austin	M. Oct. 4, 1893.	Aug. 29, 1901.	.....
Randolph, James Lingan	M. Mar. 1, 1882.	Sept. 17, 1888.	XVIII, 217
Raymond, Thomas Laidlaw	M. Oct. 6, 1897.	Nov. 15, 1901.	*XLIX, 354*
Reece, Benjamin	M. Mar. 2, 1881.	Dec. 17, 1901.	.....
Reed, Edward M.	M. July 10, 1872.	Feb. 13, 1892.	XVIII, 94
Reed, Henry Wadsworth	M. Jan. 6, 1886.	Oct. 26, 1900.	.....
Reed, Samuel Benedict	M. Oct. 20, 1869.	Dec. 25, 1891.	XVIII, 183
Reed, William Ward	F. Dec. 20, 1872.	Jan. 10, 1904.	*LII, 558*
Reeves, Samuel J.	M. April 5, 1868.	Dec. 15, 1878.	V, 93
Reinholdt, Kenneth Oake Plummer	J. Feb. 6, 1894. / A. M. Oct. 7, 1896.	Feb. 6, 1902.	*XLIX, 368*
Reiseger, Marc John	M. Dec. 7, 1898.	May 26, 1900.	*XLV, 634*
Reno, James Hart	M. Nov. 5, 1879.	Aug. 5, 1881.	*XXXVII, 566*
Rhodes, Benjamin	M. April 5, 1882.	Aug. 12, 1894.	XX, 163
Rice, Edward Curtis	M. April 7, 1875.	April 21, 1898.	*XXXIX, 703*
Rich, Watson Wellman	M. Sept. 5, 1883.	Jan. 12, 1903.	*L, 501*

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Richards, Joseph Ruggles	A. Feb. 4, 1880.	Sept. 28, 1900.	*XLV, 640*
Richardson, B. Frank	M. July 1, 1885.	April 18, 1904.	.....
Rinecker, Francis	M. Aug. 7, 1872.	April 10, 1899.	*XLII, 569*
Rives, Alfred L.	M. Sept. 4, 1872.	Feb. 27, 1903.	.....
Roberts, William Milnor	M. Sept. 21, 1870.	July 14, 1881.	*XXXVI, 531*
Robinson, Moncure	H. M. July 6, 1853.	Nov. 10, 1891.	XVIII, 84
Roebling, John Augustus	M. Dec. 2, 1868.	July 22, 1869.	.....
Rogers, Albert Brainerd	M. June 6, 1883.	May 4, 1889.	XVI, 98
Rogers, Fairman	M. May 7, 1873.	Aug. 22, 1900.	.....
Rogers, John Benjamin	M. Aug. 4, 1873.	April 1, 1874.	I, 168
Rosecrans, William Starke	M. July 5, 1882.	Mar. 11, 1898.	.....
Rosenzweig, Alfred	{ Jun. June 7, 1882. M. Jan. 4, 1893. }	Jan. 13, 1904.	.....
Rothwell, Richard Pennefather	M. Jan. 29, 1868.	April 17, 1901.	....
Rowe, Robert Delos	M. Jan. 2, 1890.	Mar. 14, 1899.	*XLII, 571*
Rudloff, Henry Frederick	M. Jan. 6, 1886.	June 1, 1895.	*XXXVI, 570*
Rusling, George McCracken	M. Nov. 1, 1882.	Feb. 26, 1901.	.....
Russell, Nathaniel Edwards	M. Oct. 3, 1888.	Jan. 14, 1902.	*XLIX, 355*
St. John, Isaac Munroe	M. July 14, 1871.	April 7, 1880.	*XXXVI, 571*
Scherzer, William	M. Sept. 5, 1888.	July 20, 1893.	XX, 58
Schott, Charles Ridgely	M. April 1, 1874.	July 9, 1878.	IV, 128
Schuyler, Howard	M. June 7, 1882.	Dec. 3, 1883.	*XXXVI, 572*
Scott, William Lawrence	F. July 7, 1870.	Sept. 19, 1891.	XVII, 285
Scott, William Ulysses	A. M. Feb. 3, 1897.	Sept. 26, 1898.	*XLII, 572*
Scowden, Theodore Ransom	M. May 7, 1873.	Dec. 31, 1881.	.....
Seely, Thomas Jennings	M. Feb. 1, 1882.	Oct. 2, 1883.	*XXXVI, 574*
Seitzinger, William White	J. Oct. 2, 1889.	Sept. 21, 1900.	.....
Seymour, Mark Tucker	F. July 21, 1870.	May 30, 1885.	*XXXVII, 578*
Shaler, Ira Alexander	{ J. July 4, 1888. M. June 5, 1895. }	June 29, 1902.	*XLIX, 357*
Shanks, Thomas Pearman	M. May 2, 1888.	Jan. 7, 1904.	..... .
Sheldon, Simeon	M. Feb. 5, 1873.	Mar. 4, 1883.	.....
Shinn, William Powell	M. Sept. 15, 1869.	May 5, 1892.	XVIII, 123
Shirreffs, Reuben	M. June 4, 1890.	Aug. 31, 1904.	.....
Shreve, Samuel Henry	M. May 19, 1869.	Nov. 27, 1884.	*XXXVI, 576*
Sicard, Mirtiliano	M. Jan. 4, 1882.	Mar. 17, 1896.	*XL, 577*
Sickels, Frederick Ellsworth	M. Jan. 7, 1891.	Mar. 9, 1895.	*XXXVI, 577*
Sickels, Theophilus E.	M. Feb. 21, 1872.	Feb. 4, 1885.	XI, 130
Sidell, William H.	M. Dec. 1, 1852.	July 1, 1873.	I, 41
Sites, Wilmon W. C.	M. Nov. 6, 1878.	Oct. 1, 1885.	*XXXVI, 582*
Sloan, Robert Imlay	M. Oct. 1, 1884.	May 3, 1901.	*XLVI, 562*
Smedley, Samuel Lightfoot	M. Sept. 2, 1874.	July 21, 1894.	XXI, 88
Smith, Benjamin Burgh	M. Nov. 7, 1888.	Feb. 8, 1904.	*LII, 550*
Smith, Charles Augustus	M. April 7, 1880.	Feb. 2, 1884.	XI, 122

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Smith, Charles C.	M. July 10, 1872.	April 17, 1889.	XV, 142
Smith, Charles Shaler	M. Mar. 5, 1873.	Dec. 19, 1886.	XIII, 105
Smith, Charles Vandervoort	M. July 5, 1876.	June 30, 1884.	XI, 126
Smith, David Lowber	M. May 4, 1887.	Oct. 10, 1893.	XX, 57
Smith, Frederick Henry	M. Feb. 21, 1872.	Dec. 24, 1898.	*XLI, 643*
Smith, Hamilton	M. Feb. 5, 1879.	July 4, 1900.	*XLVI, 564*
Smith, Isaac Williams	M. Oct. 1, 1873.	Jan. 1, 1897.	*XXXVIII, 456*
Smith, Lucius A.	M. May 7, 1873.	Jan. 5, 1894.	XX, 48
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Spörck, Karl	M. Mar. 2, 1898.	June 23, 1899.	.....
Stahlberg, Albert Jacob	J. Mar. 4, 1874.	Aug. 19, 1887.	*XXXVI, 597*
Stanwood, James Hugh	A. M. Oct. 3, 1894.	May 24, 1896.	*XXXVI, 590*
Starling, William	M. Sept. 7, 1887.	Dec. 11, 1900.	*XLVI, 566*
Steward, Herbert	A. Feb. 6, 1894.	Mar. 4, 1899.	.....
Stewart, David A.	F. Nov. 7, 1872.	Dec. 14, 1888.	XIX, 160
Stixrud, Martinius	M. April 3, 1889.	Dec. 28, 1901.	*LI, 463*
Stone, Waterman	A. Dec. 1, 1886.	Mar. 30, 1896.	*XLI, 649*
Storrow, Charles Storer	Hon. M. Jan. 24, 1893.	April 30, 1904.	.....
Stratton, Franklin Asa	M. May 3, 1876.	July 17, 1879.	V, 96
Striedinger, Julius Hermann	M. Feb. 2, 1876.	Sept. 28, 1894.	XX, 198
Swan, Charles Herbert	M. Mar. 16, 1870.	April 17, 1899.	*XLVI, 568*
Sweet, Elnathan	M. Nov. 6, 1878.	Jan. 27, 1903.	.....
Swift, McRee	M. Nov. 6, 1852. / F. Mar. 9, 1870.	April 5, 1896.	*XXXVI, 616*
Taintor, William Noyes	J. Sept. 3, 1895.	April 8, 1898.	*XXXIX, 704*
Talcott, Cook	M. April 15, 1868.	Jan. 12, 1893.	XIX, 99
Talcott, William Hubbard	M. Feb. 2, 1853.	Dec. 8, 1868.	XIX, 97
Tallon, John Joseph	J. Sept. 3, 1890.	May † 1896.	.....
Tasker, Charles A.	J. Nov. 4, 1874.	Oct. 4, 1879.	VII, 91
Tasker, Stephen Paschall Morris	F. Sept. 20, 1872.	Mar. 19, 1900.	*XLVI, 572*
Tasker, Thomas T., Jr.	F. Jan. 7, 1873.	Aug. 19, 1877.	.....
Taylor, Selwyn Mellon	M. Oct. 7, 1903.	Jan. 25, 1904.	*LII, 552*
Taylor, William Johnston	F. May 10, 1870.	Feb. 17, 1903.	.....
Temple, John Frederic	J. Feb. 5, 1890. / A. M. Oct. 4, 1893.	July 21, 1895.	XXI, 183
Temple, Robert Henry	M. May 6, 1885.	Dec. 23, 1901.	.....
Thaw, William	F. Aug. 30, 1871.	Aug. 17, 1889.	XVI, 100
Thayer, William Watmough	A. M. Dec. 2, 1891.	Mar. 14, 1893.	XIX, 94
Thomas, Arthur Towne	M. June 6, 1894.	Oct. 10, 1900.	*XLIX, 360*
Thomas, Joseph Russell	M. Oct. 5, 1881.	Nov. 28, 1896.	*XXXVII, 566*

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† Precise date of death unknown.

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Thompson, John Chambers	M. May 18, 1870.	Jan. 17, 1880.	*XXXVI, 584*
Thompson, William George McNeill	M. July 2, 1879.	May 12, 1903.	.....
Thorndike, John Larkin	M. May 7, 1873.	Oct. 12, 1901.	.....
Thurston, Robert Henry	M. Dec. 6, 1871.	Oct. 25, 1903.	.....
Tidd, Marshall Martain	M. Oct. 2, 1878.	Aug. 20, 1895.	*XXXVII, 568*
Tingley, George Curtis	M. Sept. 6, 1871.	April 30, 1904.	*LIII, 510*
Totten, Joseph Gilbert	H. M. Mar. 2, 1853.	April 22, 1864.	*XXXVI, 525*
Toucey, John Montgomery	F. May 17, 1870.	Sept. 29, 1898.	*XLV, 644*
Tower, Ashley Bemis	M. Oct. 3, 1894.	July 8, 1901.	*XLIX, 361*
Tracy, Edward Huntington	M. June 13, 1868.	Aug. 28, 1875.	I, 337
Tracy, John F.	F. Jan. 20, 1873.	Feb. 13, 1878.	IV, 71
Trafton, Gilman	M. Jan. 4, 1871.	May 25, 1887.	XV, 42
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Tullock, Alonzo J	M. June 6, 1883.	July 21, 1904.	.....
Tyson, Henry	M. July 10, 1872.	Sept. 1, 1877.	IV, 110
Vanderpool, Eugene	M. Sept. 2, 1874.	July 12, 1903.	.....
Van Slooten, William	M. Nov. 3, 1897.	Dec. 14, 1901.	.....
Vaughan, Frederic Willis	M. Feb. 17, 1869.	Oct. 19, 1887.	XV, 44
Veazie, Joseph	M. May 3, 1876.	Mar. 2, 1897.	.....
Vinton, Francis Laurens	M. Aug. 5, 1868.	Oct. 6, 1879.	VIII, 91
Waite, Christopher Champlin	M. Mar. 3, 1880.	Feb. 21, 1896.	*XLIX, 363*
Walker, William Williams	M. Oct. 6, 1880.	Sept. 23, 1893.	XIX, 174
Walling, Henry Francis	M. May 6, 1868.	April 8, 1888.	XV, 140
Walton, Louis Roberts	M. April 1, 1885.	Nov. 9, 1885.	*XXXVI, 586*
Ward, Lebbeus Baldwin	M. Mar. 16, 1870.	July 2, 1901.	.....
Wardlaw, James Robert	M. Mar. 3, 1886.	Dec. 27, 1891.	XVIII, 96
Ware, Reuel Willard	M. April 1, 1874.	Sept. 10, 1903.	.....
Watkins, John Elfreth	A. Jan. 2, 1889.	Aug. 11, 1903.	.....
Way, Robert Attwell	M. June 7, 1893.	April † 1901.	.....
Weber, Christian Philipp Max Maria, Baron von	H. M. June 2, 1880.	April 18, 1881.	VIII, 89
Weir, Frederic Candee	M. Aug. 7, 1872.	Mar. 1, 1899.	.....
Welch, Ashbel	M. Aug. 7, 1872.	Sept. 25, 1882.	IX, 137
Weld, Frederick Floyd	M. Sept. 3, 1884.	June 28, 1890.	XVII, 203
Wellington, Arthur Mellen	M. May 4, 1881.	May 16, 1895.	XXI, 199
Wellman, David Willard	M. Oct. 5, 1870.	Aug. 18, 1898.	.....
Wells, Daniel L.	F. June 13, 1883.	Nov. 24, 1884.	XI, 132
Wheaton, Edward	A. Feb. 4, 1880.	Mar. 6, 1889.	.....
Wheeler, Orlando Belina	M. Nov. 2, 1887.	June 3, 1896.	*XXXVI, 587*
Whipple, Squire	H. M. May 6, 1868.	Mar. 15, 1888.	*XXXVI, 527*
White, William Howard	M. Mar. 5, 1873.	Dec. 11, 1895.	*XLV, 635*

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Whitelaw, John	M. Feb. 5, 1873.	June 16, 1892.	XVIII, 191
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Whitman, Thomas Jefferson	M. Jan. 29, 1868.	Nov. 25, 1890.	XVIII, 103
Whitney, Nelson Oliver	M. Mar. 1, 1893.	Mar. 18, 1901.	.....
Whitton, Andrew Dempster	M. May 6, 1891.	Feb. 23, 1892.	XX, 85
Wightman, Henry Morse	M. April 2, 1873.	April 3, 1885.	XII, 124
Wightman, Willard Humphrey	M. Sept. 5, 1888.	Oct. 29, 1889.	XVI, 218
Williams, Edward Higginson	M. Sept. 5, 1883.	Dec. 21, 1899.	.....
Williams, Norman A.	M. Feb. 17, 1869.	Oct. 12, 1879.	VIII, 92
Williams, William	F. June 16, 1870.	Sept. 10, 1876.	.....
Williamson, William Garnett	M. April 4, 1883.	Aug. 2, 1898.	*XLI, 645*
Wilson, Arthur Owen	M. Mar. 7, 1888.	Dec. 20, 1891.	XVIII, 131
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Wilson, Joseph Miller	M. April 2, 1873.	Nov. 24, 1902.	*L, 504*
Wilson, William Hasell	H. M. Aug. 2, 1892.	Aug. 17, 1902.	.....
Wilson, William Willard	M. Jan. 5, 1870.	Feb. 7, 1887.	XIII, 40
Wood, Arthur Hastings	J. Mar. 31, 1891.	April 2, 1892.	XVIII, 106
Wood, Charles	A. M. July 4, 1894.	Nov. 28, 1895.	*XXXVI, 591*
Worthen, William Ezra	M. Dec. 4, 1867. / H. M. April 4, 1893.	April 2, 1897.	*XL, 565*
Worthington, Henry R.	M. Jan. 5, 1876.	Dec. 17, 1880.	.....
Wright, George Francis	M. Jan. 4, 1888.	Aug. 20, 1892.	XVIII, 206
Wright, Horatio Gouverneur	H. M. Mar. 3, 1890.	July 2, 1899.	*XLVI, 551*
Wright, Joshua Butler	F. May 24, 1870.	Oct. 31, 1877.	.....
Wright, William Wierman	M. Mar. 3, 1875.	Mar. 9, 1882.	VIII, 119
Würtele, Arthur Sheppard Campbell	M. Mar. 5, 1873.	Mar. 20, 1899.	.....
Yeatman, Henry Clay	J. May 7, 1890.	Dec. 20, 1896.	*XL, 579*
Yorke, Edward	M. Nov. 1, 1882.	May 28, 1884.	XI, 124
Young, Herbert Andrew	J. May 7, 1884.	Dec. 8, 1894.	XXI, 69
Young, William Clark	H. M. Mar. 1, 1892.	Dec. 22, 1893.	XIX, 192

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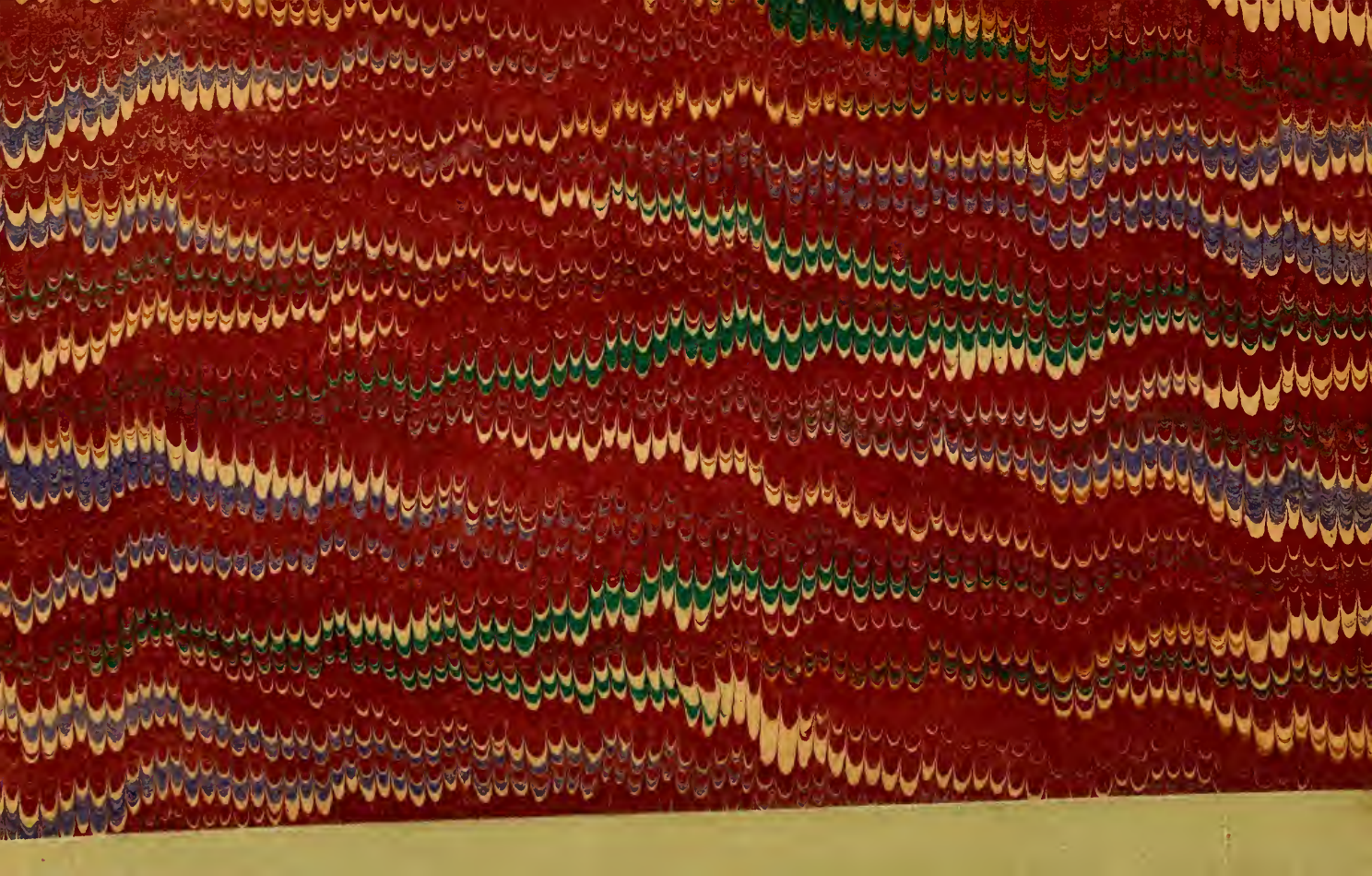

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